CG-273-94

TECHNICAL MANUAL

*for*

# TRANSMITTING SET, RADIO AN/URT-20

INLAND ELECTRONICS CORP.
AURORA, ILLINOIS

TREASURY DEPARTMENT
U.S. COAST GUARD

*Contracts: Tcg-41445 Approved by U. S. Coast Guard: 10 January 1964*
*Tcg-41645*

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| PAGE NUMBERS | CHANGE IN EFFECT | PAGE NUMBERS | CHANGE IN EFFECT |
|---|---|---|---|
| Title Page | Original | 4-0 to 4-4 | Original |
| ii to vii | Original | 5-1 to 5-19 | Original |
| 1-0 to 1-4 | Original | 6-0 to 6-6 | Original |
| 2-1 to 2-9 | Original | 7-1 to 7-26 | Original |
| 3-0 to 3-5 | Original | i-1 to i-3 | Original |

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LETTER OF PROMULGATION

1. CG-273-94 is the Technical Manual for Radio Transmitting set, Type AN/URT-20 and is effective upon receipt. The two copies furnished with the equipments are parts thereof and shall accompany the basic equipment.

2. Extracts from this publication may be made to facilitate the preparation of other technical manuals and handbooks.

3. Copies of this publication may be obtained by requisition to Commanding Officer, U. S. Coast Guard Supply Center, Brooklyn, New York.

4. Corrections to this publication will be made by serially numbered Field Changes. They shall be entered promptly by responsible personnel.

T. J. FABIK
Chief, Office of Engineering

RECORD OF CORRECTIONS MADE

| Change No. | Date | Field Change No. | Signature |
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# TABLE OF CONTENTS

## SECTION 1—GENERAL INFORMATION


| Paragraph | | Page |
|---|---|---|
| 1-1. | Scope | 1-1 |
| 1-2. | Purpose of Equipment | 1-1 |
| 1-3. | Functional Description | 1-1 |
| 1-4. | Quick Reference Data | 1-2 |
| 1-5. | Equipment Lists | 1-2 |


## SECTION 2—INSTALLATION


| | | |
|---|---|---|
| 2-1. | Unpacking and Handling | 2-1 |
| 2-2. | Power Requirements and Distribution | 2-1 |
| 2-3. | Installation Layout | 2-1 |
| 2-4. | Installation Requirements | 2-1 |
| 2-5. | Inspection and Adjustments | 2-4 |
| 2-6. | Preparation for Reshipment | 2-8 |


## SECTION 3—OPERATOR'S SECTION


| | | |
|---|---|---|
| 3-1. | Functional Operation | 3-0 |
| 3-2. | Preparation for Use | 3-0 |
| 3-3. | Operating Procedures | 3-0 |
| 3-4. | Summary of Operating Procedures | 3-3 |
| 3-5. | Emergency Operation | 3-3 |
| 3-6. | Operator's Maintenance | 3-4 |


## SECTION 4—PRINCIPLES OF OPERATION


| Paragraph | | Page |
|---|---|---|
| 4-1. | Functional Description | 4-0 |
| 4-2. | Functional Sections of the Transmitter | 4-0 |
| 4-3. | Functional Sections of Antenna Coupler | 4-3 |
| 4-4. | Functions of Modulations | 4-4 |


## SECTION 5—TROUBLE SHOOTING


| | | |
|---|---|---|
| 5-1. | General | 5-1 |
| 5-2. | Test Equipment | 5-1 |
| 5-3. | Overall Trouble Shooting | 5-1 |
| 5-4. | Typical Troubles | 5-1 |
| 5-5. | Location of Parts | 5-1 |


## SECTION 6—SERVICE AND REPAIR


| | | |
|---|---|---|
| 6-1. | Failure Report | 6-0 |
| 6-2. | Preventive Maintenance | 6-0 |
| 6-3. | Performance Standards | 6-0 |
| 6-4. | Tuning and Adjustments | 6-0 |
| 6-5. | Removal, Repair and Replacement | 6-1 |
| 6-6. | Overall Schematic Diagrams | 6-2 |


## SECTION 7—PARTS LIST


| | | |
|---|---|---|
| 7-1. | Introduction | 7-1 |
| 7-2. | Maintenance Parts List | 7-1 |
| 7-3. | Stock Number Identification | 7-1 |
| 7-4. | List of Manufacturers | 7-1 |

INDEX . . . . . i-1


# LIST OF ILLUSTRATIONS

## SECTION 1—GENERAL INFORMATION


| Figure | | Page |
|---|---|---|
| 1-1. | Transmitting Set, Radio, AN/URT-20 and Coupler, Antenna, CU-1064/URT-20 | 1-0 |


## SECTION 2—INSTALLATION


| | | |
|---|---|---|
| 2-1. | Fuse and Terminal Block Locations, Bottom of Cabinet CY-3623/URT-20 | 2-1 |
| 2-2. | Transmitting Set, AN/URT-20 Outline Drawing | 2-2 |
| 2-3. | Antenna Coupler, CU-1064/URT-20. Outline Drawing | 2-3 |
| 2-4. | Transmitter to Coupler Interconnection Diagram | 2-4 |
| 2-5. | External Connections to Transmitter | 2-4 |


## SECTION 2—INSTALLATION (CONT)


| Figure | | Page |
|---|---|---|
| 2-6. | Interconnection Diagram for Transmitter Chassis | 2-5 |
| 2-7. | Antenna Coupler Load Calibration Curves | 2-6 |


## SECTION 3—OPERATOR'S SECTION


| | | |
|---|---|---|
| 3-1. | Radio Transmitter, AN/URT-20 Controls | 3-1 |
| 3-2. | Antenna Coupler, CU-1064/URT-20. | 3-2 |


## SECTION 4—PRINCIPLES OF OPERATION


| | | |
|---|---|---|
| 4-1. | Transmitter and Antenna Coupler Component Block Diagram | 4-0 |
| 4-2. | Power Supply Distribution Block Diagram | 4-1 |

## LIST OF ILLUSTRATIONS (CONT)

### SECTION 4—PRINCIPLES OF OPERATION (CONT)


| Figure | | Page |
|---|---|---|
| 4-3. | Transmitter Block Diagram | 4-1 |
| 4-4. | Partial Schematic Diagram of RF Oscillator, Amplifier and Keying Circuit | 4-2 |
| 4-5. | Partial Schematic of RF Amplifier Circuit | 4-3 |
| 4-6. | Partial Schematic of Printed Circuit Modulator | 4-4 |
| 4-7. | Partial Schematic of 800 Cycle Modulator | 4-4 |


### SECTION 5—TROUBLE SHOOTING


| Figure | | Page |
|---|---|---|
| 5-1. | Primary Power Supply Distribution Schematic Diagram | 5-2 |
| 5-2. | Amplifier Oscillator Chassis AM-3340/URT-20 Resistance and Voltage Measurements | 5-7 |
| 5-3. | Radio Frequency Amplifier Chassis. AM-3341/URT-20 Resistance and Voltage Measurements | 5-8 |
| 5-4. | Power Supply Chassis PP-3385/URT-20 Parts Location Views | 5-9 |
| 5-5. | Power Supply Chassis Terminal Board Components | 5-10 |
| 5-6. | Amplifier Oscillator Chassis AM-3340/URT-20 Parts Location View | 5-11 |


### SECTION 5—TROUBLE SHOOTING (CONT)


| Figure | | Page |
|---|---|---|
| 5-7. | Amplifier Oscillator Keyer Subchassis and Terminal Board A201 Parts Location Views | 5-12 |
| 5-8. | Amplifier Oscillator RF Oscillator Subchassis Parts Location View | 5-13 |
| 5-9. | Amplifier Oscillator Terminal Board Components | 5-14 |
| 5-10. | Radio Frequency Amplifier AM-3341/URT-20 Parts Location View | 5-15 |
| 5-11. | Radio Frequency Amplifier Terminal Board Components | 5-16 |
| 5-12. | Electrical Equipment Cabinet CY-3623/URT-20 Parts Location View | 5-17 |
| 5-13. | Antenna Coupler CU-1064/URT-20 Parts Location View | 5-18 |
| 5-14. | Antenna Coupler Terminal Board | 5-19 |


### SECTION 6—SERVICE AND REPAIR


| | | |
|---|---|---|
| 6-1. | Winding Data for Transformer T205. | 6-2 |
| 6-2. | Winding Data for Transformer T301. | 6-2 |
| 6-3. | Winding Data for Transformer T302. | 6-2 |
| 6-4. | Radio Transmitting Set AN/URT-20. Schematic Diagram | 6-3 |
| 6-5. | Antenna Coupler CU-1064/URT-20 Schematic Diagram | 6-5 |


## LIST OF TABLES

### SECTION 1—GENERAL INFORMATION


| Table | | Page |
|---|---|---|
| 1-1. | Radio Transmitter Set, AN/URT-20. Equipment Supplied | 1-2 |
| 1-2. | Radio Transmitter Set, AN/URT-20. Equipment Required but Not Supplied | 1-3 |
| 1-3. | Radio Transmitter Set, AN/URT-20. Shipping Data | 1-3 |
| 1-4. | Radio Transmitter Set, AN/URT-20. Electron Tube and Semiconductor Complement | 1-4 |


### SECTION 3—OPERATOR'S SECTION


| | | |
|---|---|---|
| 3-1. | Transmitter Panel Meter Readings | 3-3 |
| 3-2. | Antenna Coupler Meter Readings | 3-4 |
| 3-3. | Routine Check Chart | 3-5 |


### SECTION 5—TROUBLE SHOOTING


| Table | | Page |
|---|---|---|
| 5-1. | Test Equipment | 5-3 |
| 5-2. | Trouble Shooting Chart | 5-3 |
| 5-3. | Typical Troubles | 5-5 |
| 5-4. | Power Supply Voltage Chart | 5-6 |


### SECTION 6—SERVICE AND REPAIR


| | | |
|---|---|---|
| 6-1. | Periodic Inspection Data | 6-0 |
| 6-2. | Performance Standards Data | 6-1 |


### SECTION 7—PARTS LIST


| | | |
|---|---|---|
| 7-1. | List of Major Units | 7-1 |
| 7-2. | Maintenance Parts List | 7-2 |
| 7-3. | List of Manufacturers | 7-26 |

## SAFETY NOTICE

This equipment employs voltages which are dangerous and may be fatal if contacted by operating personnel. Extreme caution should be exercised when working with the equipment.

While every practicable safety precaution has been incorporated in this equipment, the following rules must be strictly observed:

### KEEP AWAY FROM LIVE CIRCUITS

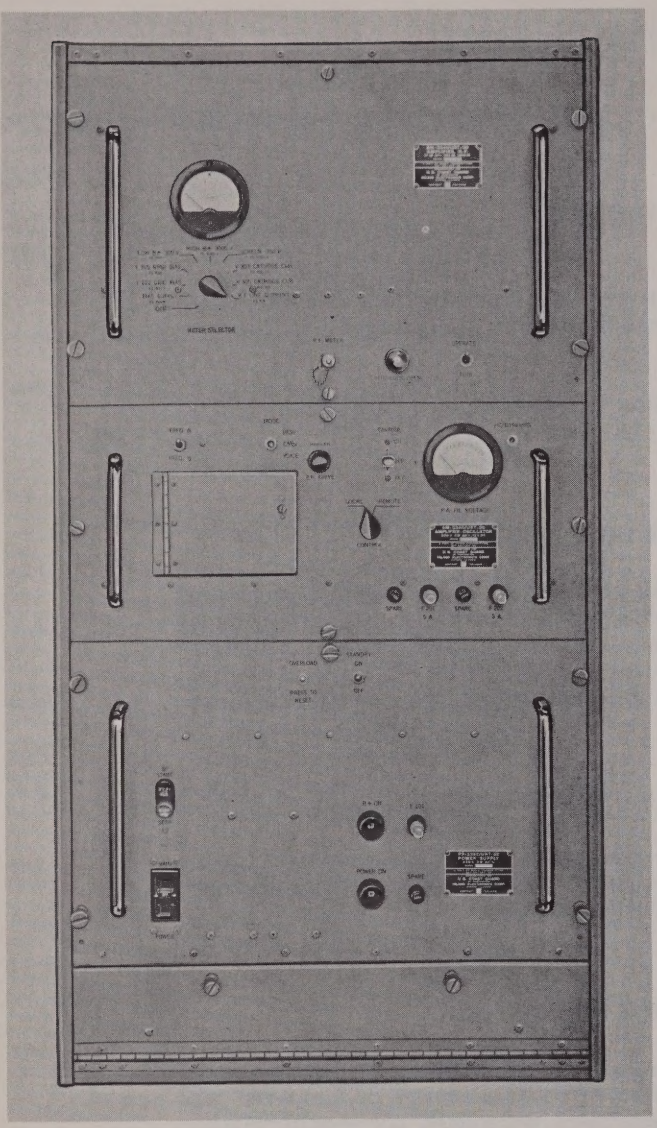
Operating personnel must at all times observe all safety regulations. Do not change tubes or make adjustments inside equipment with high voltage on. Under certain conditions dangerous potentials may exist on circuits with power controls in the off position due to charges retained by capacitors. To avoid casualties, always remove power and discharge and ground circuits prior to touching them.

### DON'T SERVICE OR ADJUST ALONE

Under no circumstances should any person reach within the equipment for the purpose of servicing or adjusting the equipment without the immediate presence or assistance of another person capable of rendering aid.

### DON'T TAMPER WITH INTERLOCKS

Do not depend upon interlocks for protection but always shut off the power. Under no circumstances should any interlock be short-circuited or tampered with in any way, by other than authorized maintenance personnel, nor should reliance be placed upon the interlock switches for removing voltages from the equipment.



Transmitting Set, Radio AN/URT-20

Coupler, Antenna CU-1064/URT-20

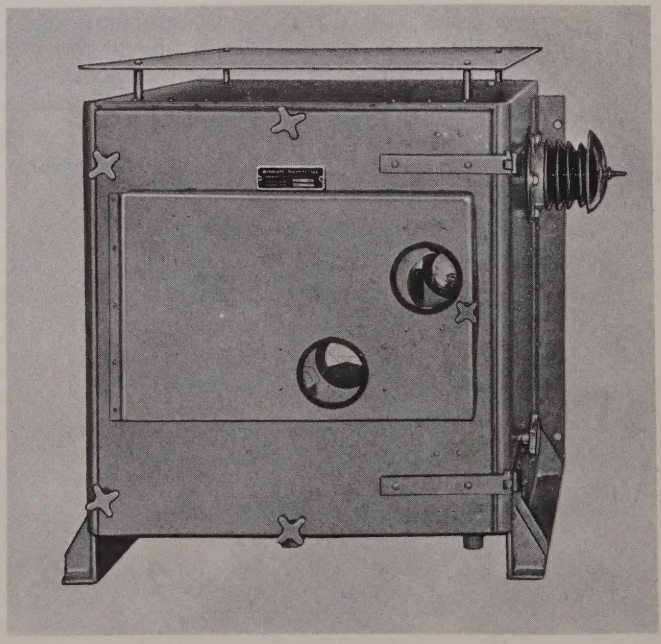


Figure 1-1. Transmitting Set, Radio, AN/URT-20 and
Coupler, Antenna, CU-1064/URT-20

# SECTION 1

# GENERAL INFORMATION

## 1-1. SCOPE.

This technical manual contains descriptive data, theory of operation, and installation and maintenance instructions for the Transmitting Set, Radio AN/URT-20 manufactured by Inland Electronics Corporation, Aurora, Illinois. See figure 1-1 for an illustration of the complete equipment. The manual is intended to provide using personnel with the necessary information to properly operate and maintain the equipment. Throughout this manual, the Transmitting Set, Radio AN/URT-20 shall be referred to as "the transmitter".

## 1-2. PURPOSE OF EQUIPMENT.

a. The Communication Transmitter and Antenna Coupling Unit are designed to provide communication frequencies of 325 to 535 kilocycles at a nominal output power rating of 500 watts. The transmitter output (700 watts max.) feeds through a 52 ohm coaxial transmission line to an antenna coupler used to match the transmitting antenna to the 52 ohm line.

b. Type A1, A2, and A3 emission is possible over the entire 325 to 535 frequency range.

A1 transmission is ON-OFF keying of the carrier frequency.

A2 transmission is ON-OFF keying of a tone modulated carrier.

A3 transmission is amplitude or voice modulation of the carrier.

c. The equipment can be keyed at a maximum rate of 50 words per minute over the entire frequency range. The 50 word rate is possible at full power output.

## 1-3. FUNCTIONAL DESCRIPTION.

a. TRANSMITTER.

(1) The transmitter is a self-contained 700 watt maximum output transmitter and power supply housed in a gray aluminum drip proof cabinet.

(2) The Cabinet, Electrical Equipment CY-3623/URT-20, referred herein as "the cabinet", encloses three slide-mounted, front-removable drawers. The drawers are secured with captive screws and can be pulled out, after loosening the screws, to gain access to the interior components of the transmitter.

(3) The top drawer is the Amplifier, Radio Frequency AM-3341/URT-20, referred herein as "the power amplifier". This amplifier uses two Eimac 4-400A power amplifiers. The amplifiers are air cooled by a fan mounted on the bottom of the power amplifier chassis.

(4) The center drawer is the Amplifier-Oscillator AM-3340/URT-20 and shall be referred to in this manual as "the amplifier-oscillator". It includes the necessary electronic components to develop the radio frequency signals required for transmission. A door on the front panel of this drawer provides access to crystal oscillators for changing the carrier frequency.

(5) The bottom drawer is the Power Supply PP-3385/URT-20 referred to in this manual as "the power supply". It is used to develop the operating potentials for transmitter operation. Circuit start-stop switches, protection devices, filtering networks and the like are included on this chassis. The input power to the power supply is connected to a fuse block located below the power supply. A terminal board for external connections is installed on an access door at the bottom of the cabinet and is exposed when the door is opened.

CAUTION

The power supply drawer cannot be pulled out until the terminal board access door is opened.

(6) Each chassis includes a safety interlock device which disconnects the high voltage output from the power supply when a chassis is pulled out. The interlock condition is indicated by a white light on the power amplifier front panel. The light glows when the interlocks are open and the switches are set for operation.

(7) The heat generated by the electronic equipment is exhausted from the transmitter cabinet by a blower installed at the top rear of the cabinet. Cool air enters the cabinet at the bottom rear of the cabinet through a dust filter.

b. ANTENNA COUPLER.

(1) The Coupler, Antenna CU-1064/URT-20, referred herein as "the antenna coupler", is located in a remote position from the transmitter. The coupler is housed in a gray aluminum cabinet. The coupler cabinet is designed for deck or bulkhead mounting and is protected against internal condensation and entrance of water.

(2) The antenna is connected to the coupler through a bowl type insulator at the top right of the coupler cabinet. A sun-shield is installed on the top of the coupler cabinet.

(3) A water tight hinged door at the front provides access for installation, adjustments, and maintenance. A small access door provides access to the tuning controls and switches. Glass windows permit viewing the meters without opening either access door.

(4) All cables connect to the bottom of the coupler cabinet. A ground connection must be attached to the coupler cabinet at the right side.

(5) The antenna coupler provides an impedance match (VSWR of 1.3:1 or better) between a 52 ohm coaxial transmission line and various antennas having electrical characteristics varying from

2 to 10 ohms and from 300 to 1200 micro-microfarads. The coupler provides this impedance matching over the frequency range of 325 to 535 kilocycles.

## 1-4. QUICK REFERENCE DATA.

a. TRANSMITTING SET, RADIO AN/URT-20.
(1) Contract number: Tcg-41645, Tcg-41445
(2) Manufacturer: Inland Electronics Corporation, Aurora, Illinois
b. COMMUNICATION TRANSMITTER.
(1) Size: See Table 1-1.
(2) Weight: 450 pounds
(3) Finish: Gray
(4) Frequency range: 325 to 535 kc/s
(5) Frequency control: Changeable quartz crystals. Frequency of crystal equal to carrier frequency. Type CR-47/U crystals in HC-6/U holders.
(6) Type of emission: Continuous wave telegraphy (A1); Continuous Wave Telegraphy modulated at audio frequency (A2); Amplitude Modulation (A3).
(7) Power output: Variable from 100 watts to 700 watts
(8) Keying rate: 50 words per minute (20 pulses per second with pulse width intervals)
(9) Rise and fall rate: 0.3 millisecond minimum; 3.0 millisecond maximum
(10) Power input: 220 (±10%) volts, 50/60 (±5%) cps, 3 phase 2500 watts
(11) Output impedance: 52 ohms
(12) Frequency stability: ±0.015%, crystal controlled
(13) Harmonic attenuation: 60 db minimum
(14) Cabinet: Dripproof
(15) Key-up radiation: less than 1 pico watt
c. ANTENNA COUPLER.
(1) Size: See Table 1-1.
(2) Weight: 140 pounds
(3) Mounting: Base or bulkhead
(4) Finish: Gray
(5) Cabinet: Spraytight
(6) Power output: 500 watts into dummy load consisting of 10 ohm resistor in series with 300 uuf capacitor
(7) Dummy load: Non-inductive 52 ohm
(8) Match antenna of 2 to 10 ohm resistance and 300 to 1200 picofarad

## 1-5. EQUIPMENT LISTS.

a. EQUIPMENT SUPPLIED. See Table 1-1.
b. EQUIPMENT REQUIRED BUT NOT SUPPLIED. See Table 1-2.
c. SHIPPING DATA. See Table 1-3.
d. ELECTRON TUBE COMPLEMENT. See Table 1-4.

TABLE 1-1. RADIO TRANSMITTER SET, AN/URT-20 EQUIPMENT SUPPLIED

| QUANTITY PER EQUIPMENT | NOMENCLATURE | | OVERALL DIMENSIONS | | | VOLUME | WEIGHT |
|---|---|---|---|---|---|---|---|
| | NAME | DESIGNATION | HEIGHT | WIDTH | DEPTH | | |
| 1 | Transmitting Set, Radio | AN/URT-20 | 45-15/16 | 24 | 24-15/16 | 16 | 450 |
| 1 | Coupler Antenna | CU-1064/ URT-20 | 29-1/8 | 32-1/8 | 25-5/16 | 7.9 | 140 |
| 2 | Technical Manuals | CG-273-94 | 11-1/4 | 8-3/4 | 3/4 | | 1 |
| 1 set | Test Data | | | | | | |
| 1 | Plastic Schematic Diagrams | | | | | | |
| 1 set | Installation Diagrams | | | | | | |
| 1 set | Tubes and Fuses | | | | | | |
| 1 set | Cable Connectors | | | | | | |

NOTE: Dimension in inches; volume in cubic feet; weight in pounds.

TABLE 1-2. RADIO TRANSMITTER SET, AN/URT-20 EQUIPMENT REQUIRED BUT NOT SUPPLIED

| QUANTITY PER EQUIPMENT | NOMENCLATURE | | REQUIRED USE | REQUIRED CHARACTERISTICS |
|---|---|---|---|---|
| | NAME | DESIGNATION | | |
| 1 | A-C Power Cable | | 220 volt power | |
| 1 | 52 Ohm Coaxial Transmission Line | RG-8/U or RG-213/U | Connection to antenna coupler | Length as required. |
| 1 | Keying Unit | AN/URA-45 | Radiobeacon Keying | |
| 1 | Antenna | | | Resistance: 2 to 10 Ω<br>Capacitance: 300 to 1200 pf |
| As necessary | Interconnecting Control Cables | | Dependent on installation Ref. Figs. 2-4 & 2-5 | Length as required. |
| As necessary | Crystals | Type CR-47/U | | Assigned frequencies |

TABLE 1-3. RADIO TRANSMITTER SET, AN/URT-20 SHIPPING DATA

| BOX NO. | NOMENCLATURE | | OVERALL DIMENSIONS | | | VOLUME | WEIGHT |
|---|---|---|---|---|---|---|---|
| | NAME | DESIGNATION | HEIGHT | WIDTH | DEPTH | | |
| 1 | Transmitter | AN/URT-20 | 54 | 29 | 30 | 27.2 | 530 |
| *2 | Coupler | CU-1064/URT-20 | 37 | 37 | 30-1/4 | 23.2 | 200 |

*Includes 1 test record, 2 technical manuals, 1 set servicing diagrams and 1 set installation diagrams.

TABLE 1-4. RADIO TRANSMITTER SET, AN/URT-20 ELECTRON TUBE AND SEMICONDUCTOR COMPLEMENT

| | 0A2WA | 4-400A | 5651 | 5749/6BA6W | 12AT7WA | 6AU6WA | 6005 | 2N335 | 1N34A | 1N445B | 1N1217 | 1N1224 | 1N3828A | 1N2976B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V201, Audio Oscillator | | | | 1 | | | | | | | | | | |
| V202, Audio Amplifier | | | | | | 1 | | | | | | | | |
| V203, Mixer | | | | | | 1 | | | | | | | | |
| V204, V205, RF Oscillator | | | | | | 2 | | | | | | | | |
| V206, V207, RF Keyer Amplifier | | | | | | 2 | | | | | | | | |
| V301, Phase Inverter | | | | | 1 | | | | | | | | | |
| V304, Driver Amplifier | | | | | | | 1 | | | | | | | |
| V208, Bias Voltage Regulator | | | 1 | | | | | | | | | | | |
| V302, Driver Amplifier | | | | | | | 1 | | | | | | | |
| V303, V305, Final Power Amplifiers | | 2 | | | | | | | | | | | | |
| V209, V210, Low B+ Regulator | 2 | | | | | | | | | | | | | |
| V306 thru V310, Screen Voltage Regulator | 5 | | | | | | | | | | | | | |
| Q201, Q202, Modulator Amplifier | | | | | | | | 2 | | | | | | |
| CR210, CR211, Bias Voltage | | | | | | | | | | 2 | | | | |
| CR203 thru CR208, Low B+ Diodes | | | | | | | | | | 6 | | | | |
| CR101, CR102, 12V Rectifiers | | | | | | | | | | | 2 | | | |
| CR103 thru CR168, HV Rectifiers | | | | | | | | | | | | 66 | | |
| CR209, CR212, Bias (T-110) | | | | | | | | | | 2 | | | | |
| CR201, Modulator Limiter | | | | | | | | | | | | | 1 | |
| CR202, Modulator Limiter | | | | | | | | | | | | | 1 | |
| CR213, Modulator 12V Regulator | | | | | | | | | | | | | | 1 |
| CR301, RF Detector | | | | | | | | | 1 | | | | | |

SECTION 2

INSTALLATION

2-1. UNPACKING AND HANDLING.

The transmitter is bolted to a wooden pallet which in turn is covered by a wooden crate. The antenna coupler, properly cushioned, is also bolted to a wooden pallet covered by a wooden crate. Two boxes are shipped as indicated in Table 1-3. Remove wooden crates carefully to prevent damage to equipment.

2-2. POWER REQUIREMENTS AND DISTRIBUTION.

a. POWER REQUIREMENTS.
The Communication Transmitter and Antenna Coupler require a source of 220 volt 3 phase 50/60 cps power with 2500 watts minimum. The voltage must be within 10 percent; the frequency within 5 percent of nominal. Connect input power to fuses F401, F402, and F403 which are located in the bottom of the cabinet behind TB401 terminal board panel (See figure 2-1.) Figure 5-1 shows primary power distribution. Use a power cable consisting of three No. 12 AWG wires.

NOTE

The six power transformers are marked with red tags. Transformers are factory wired for 220V line at pin 3. If the line voltage is below 209V, rewire to pin 2. If the line voltage is above 231V, rewire to pin 4.

2-3. INSTALLATION LAYOUT.

The equipment is designed to be installed and operated aboard U.S. Coast Guard Vessels. Space or adjustment, access to the front and rear of the unit should be provided for service, maintenance and ventilation. The exact layout to be used should be determined from layout plans and location of antenna and antenna coupler in conjunction with the transmitter. Clearance at the rear of the transmitter is required for adequate ventilation. See figures 2-2 and 2-3 for outline drawings and mounting base templates.

2-4. INSTALLATION REQUIREMENTS.

a. INSTALLATION OF TRANSMITTER AND ANTENNA COUPLER.
(1) Make certain the transmitter Main Power Switches are in OFF posiion.
(2) Use outline drawings figures 2-2 and 2-3 to mount transmitter and antenna coupler. Four 1/4 in. holes are provided in rear of fan shield of transmitter for attaching bulkhead braces.
(3) Attach a copper ground strap to right side of antenna coupler. Make certain a good bond exists for ground strap.

CAUTION

Make certain that power source is turned off before making wiring connections.

(4) Make connections between antenna coupler and transmitter (see figure 2-4).
b. OUTLINE DRAWINGS.
The equipment is shipped assembled - dimensions are indicated in figures 2-2 and 2-3. Use template drawings to fabricate mounting bases as necessary. Provide space at rear of transmitter for ventilation.
c. INTERCONNECTION DIAGRAMS.
A typical interconnection diagram is shown in figure 2-4. Use this diagram as a guide. Use figure

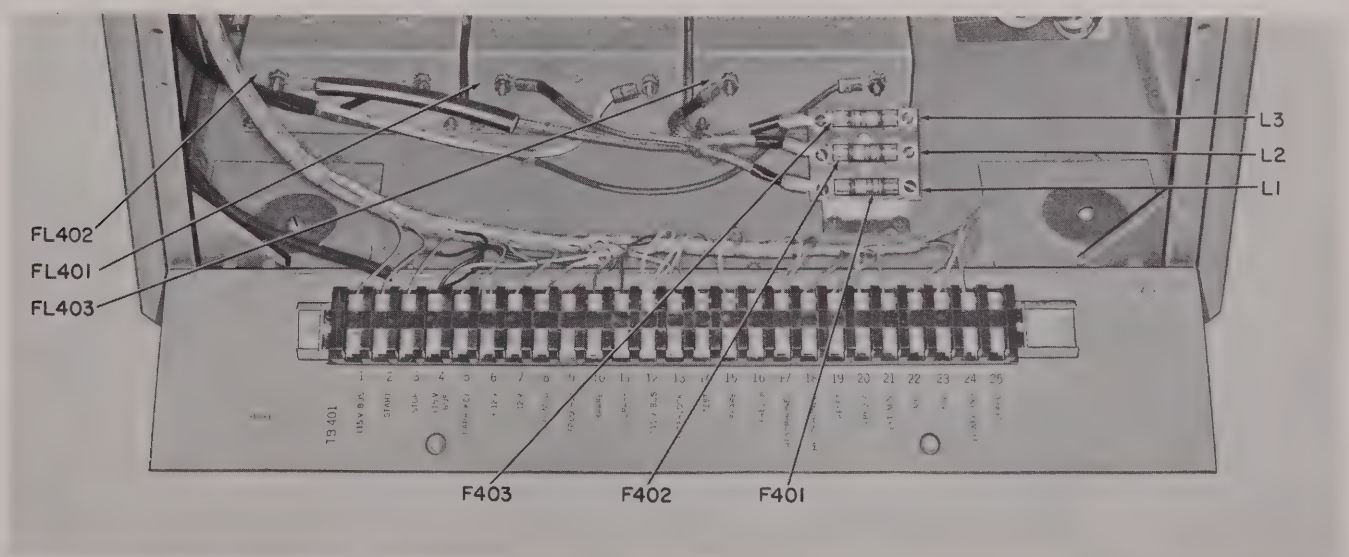



Figure 2-1. Fuse and Terminal Block Locations,
Bottom of Cabinet CY-3623/URT-20

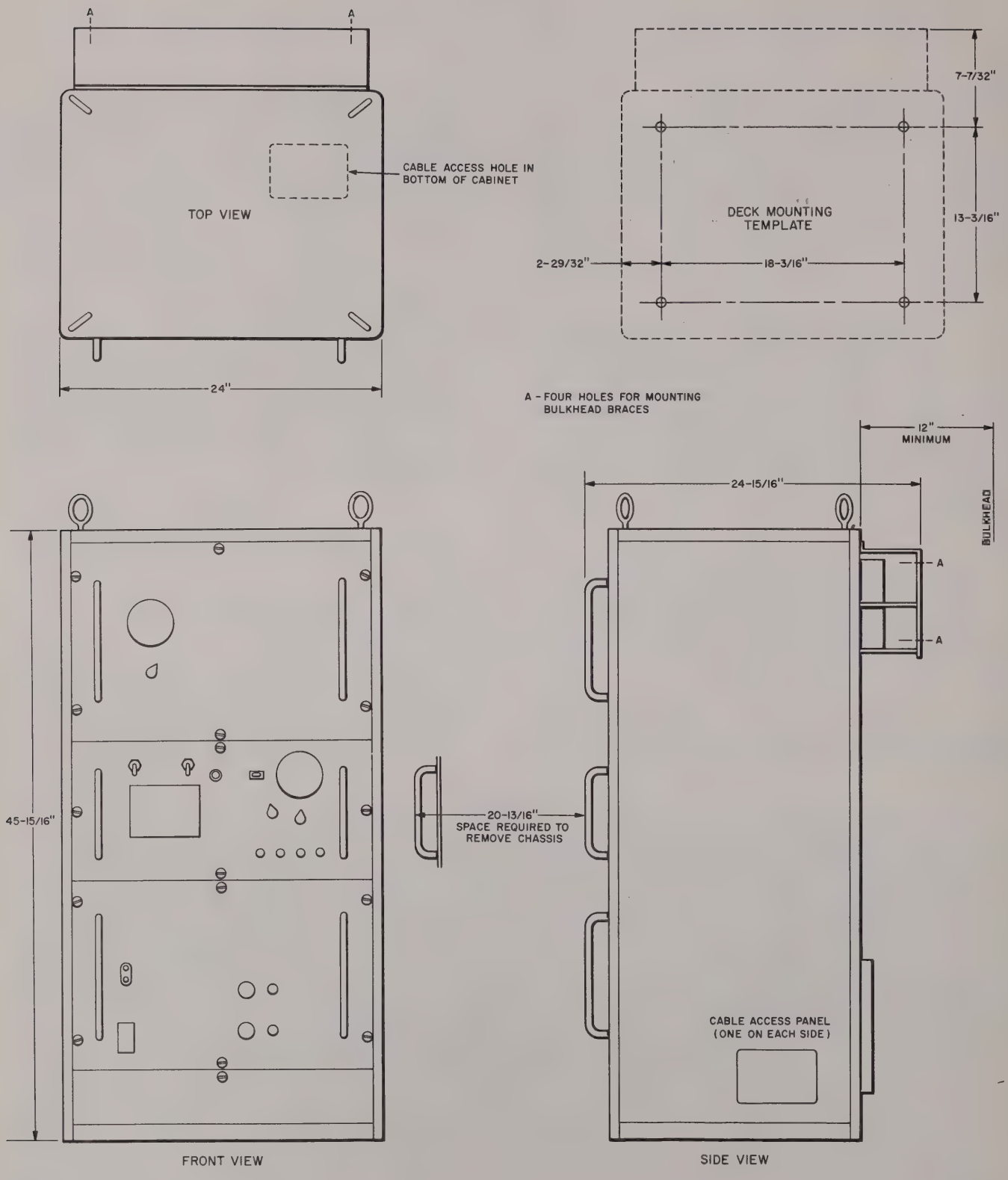



Figure 2-2. Transmitting Set, AN/URT-20 Outline Drawing

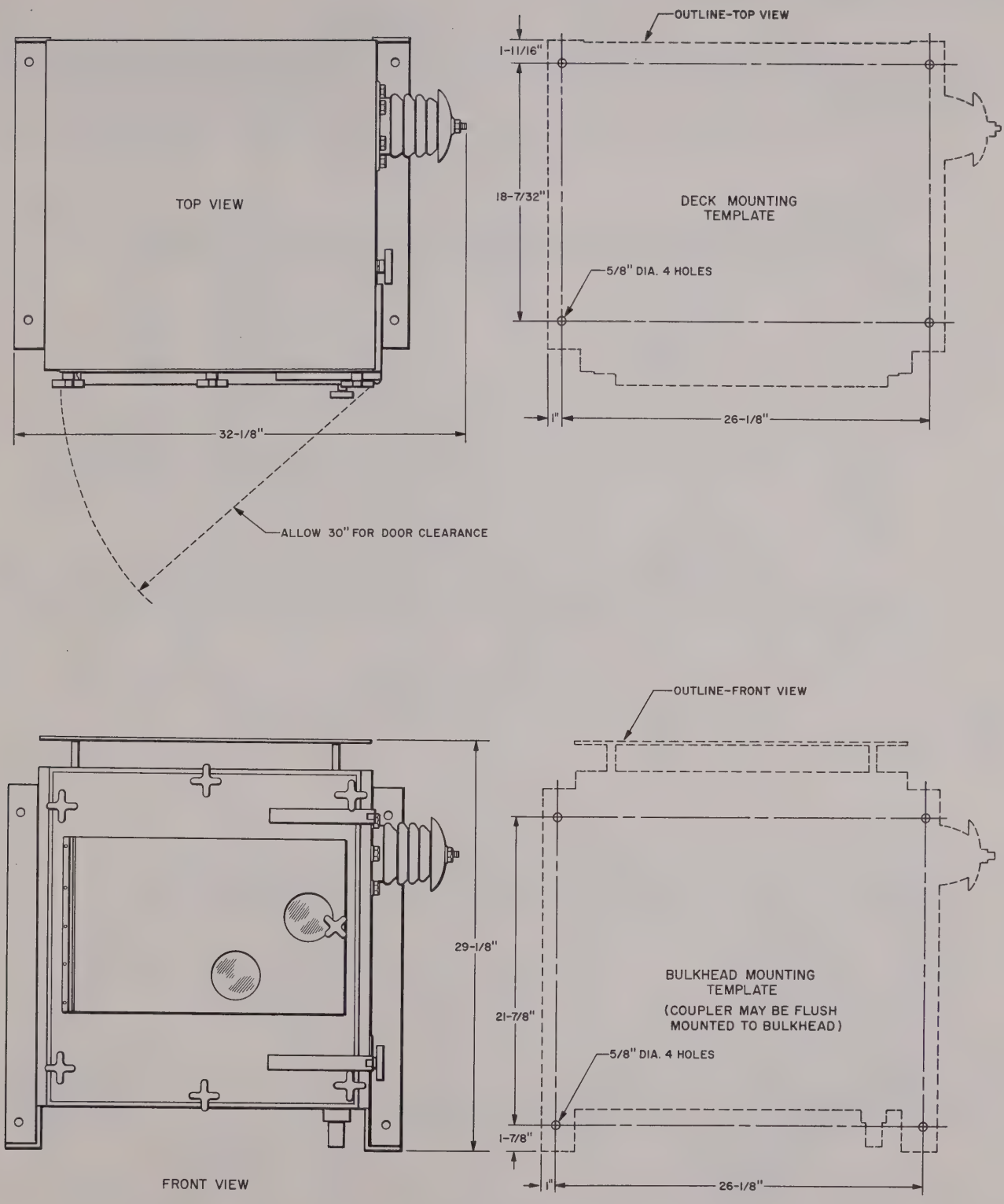



Figure 2-3. Antenna Coupler, CU-1064/URT-20 Outline Drawing

2-5 to make power supply and remote control connections. Transmitter will operate with standard Navy 6-wire remote control system.

NOTE

Refer to the applicable ship or station plans to determine exact grouping of cables for any specific installation.

2-5. INSPECTION AND ADJUSTMENTS.

a. INSPECTION.

Use the following procedures prior to starting newly installed equipment. Use these procedures to insure proper operation of equipment after prolonged shutdown.

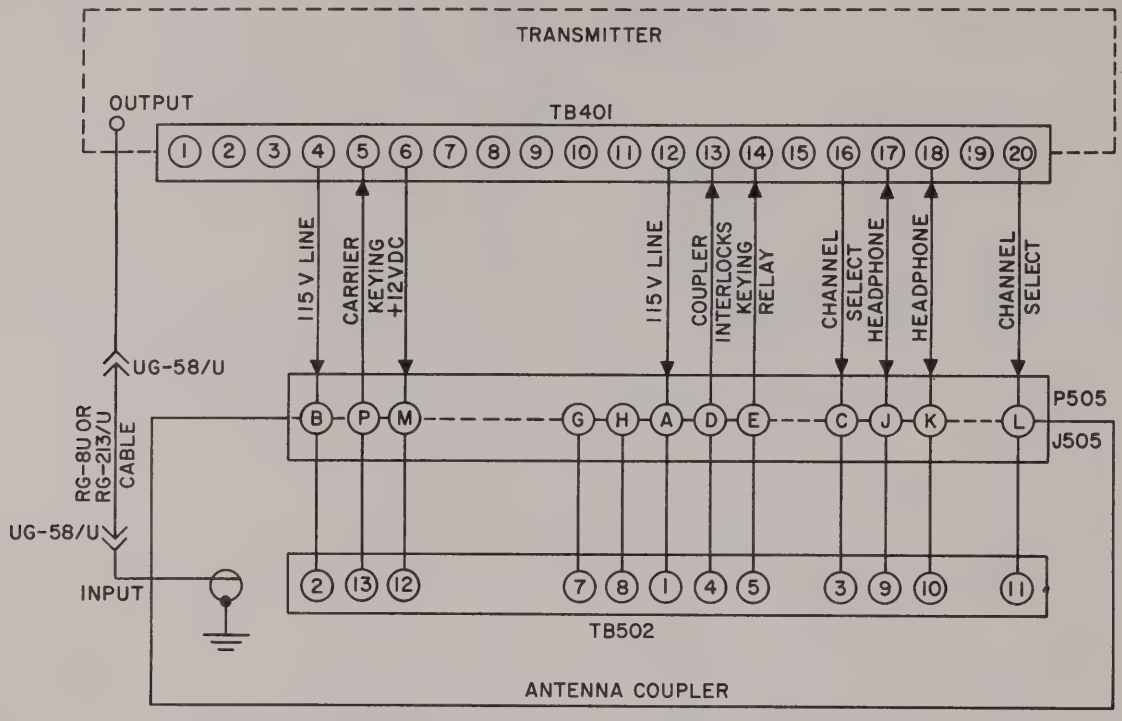



Figure 2-4. Transmitter to Coupler Interconnection Diagram

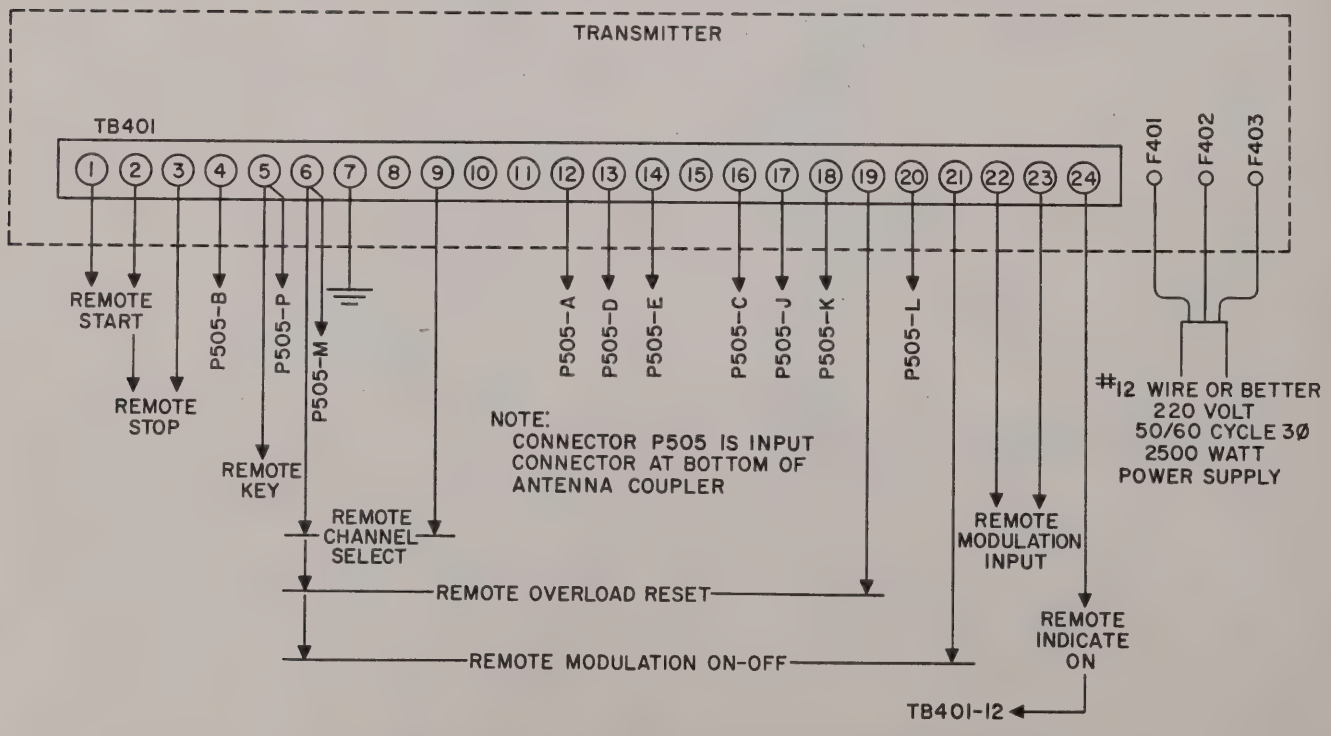



Figure 2-5. External Connections to Transmitter

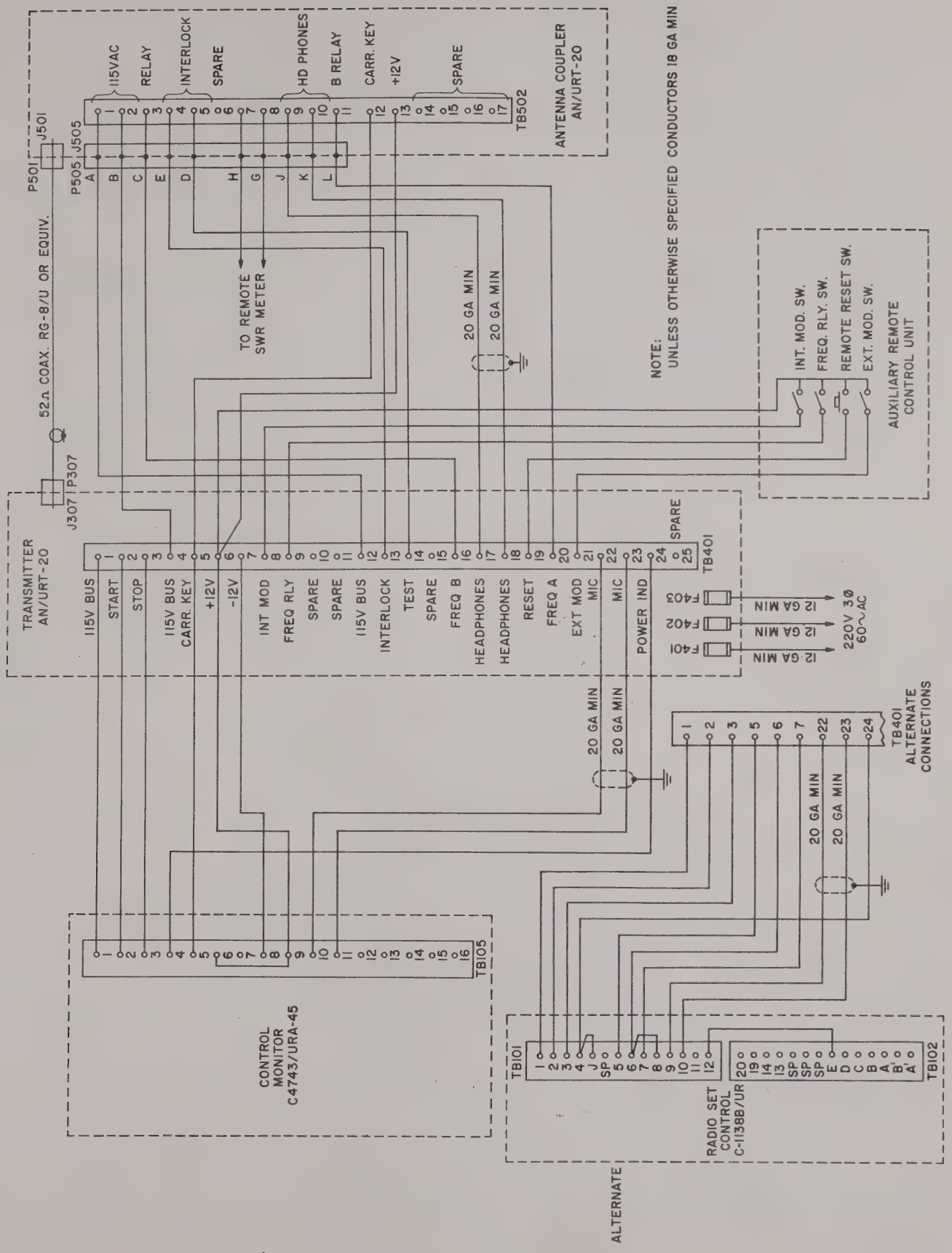



Figure 2-5a. Typical Remote Control Connection Diagram

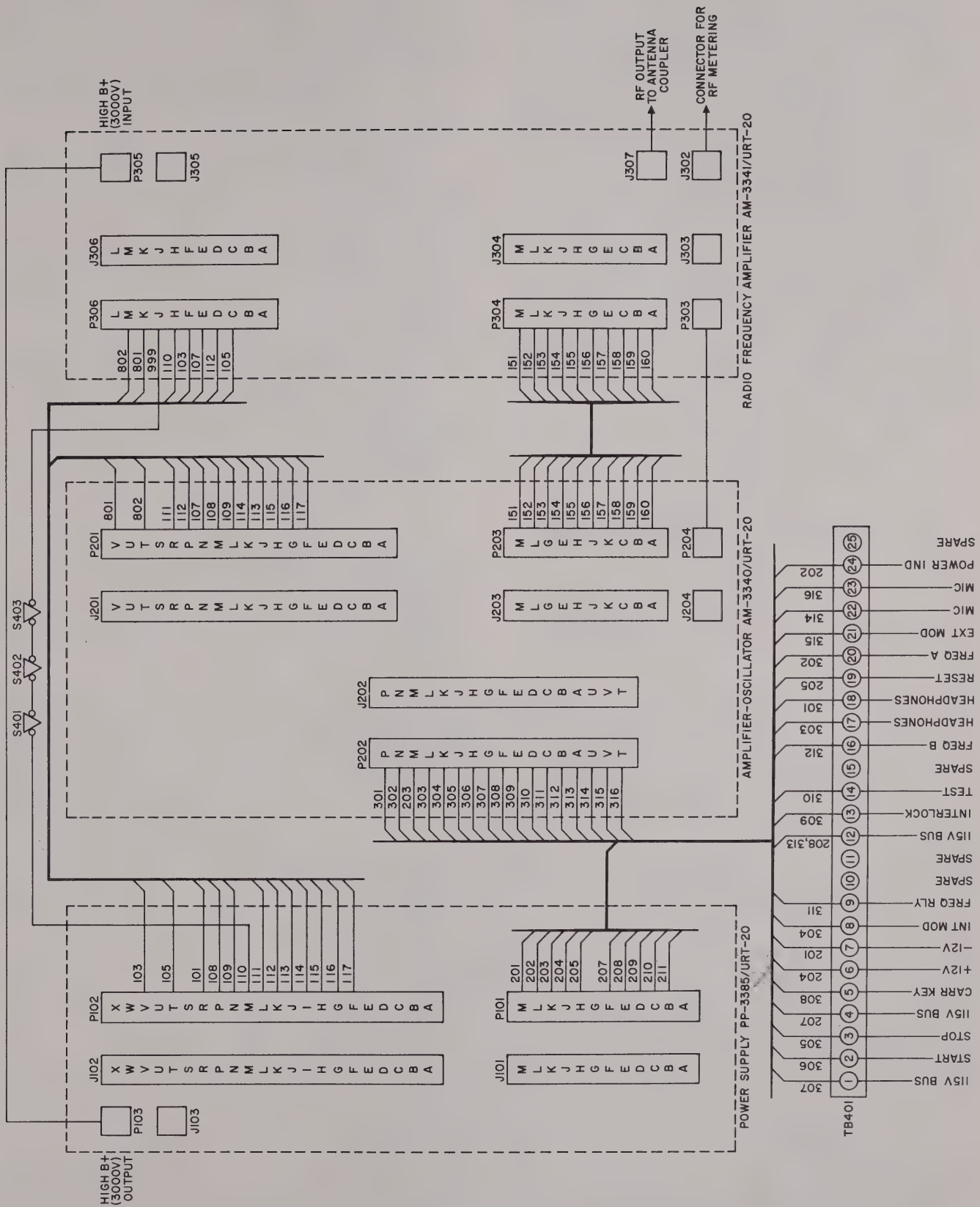



Figure 2-6. Interconnection Diagram for Transmitter Chassis

(1) Place POWER ON-OFF switch on transmitter in OFF position.

(2) Place LOCAL-REMOTE switch in LOCAL position.

(3) Inspect mounting of antenna coupler and transmitter for solid installation.

(4) Inspect RF Cable and interconnecting wires between transmitter and coupler for good connections.

(5) Inspect antenna coupler internal RF Connector to be sure it is attached to dummy load.

b. TRANSMITTER ADJUSTMENTS.

(1) After transmitter is properly installed perform the following adjustments.

(2) Place CARRIER KEY switch in ON position.

(3) Place MODULATION switch in OFF position.

(4) Check POWER ON-OFF switch for OFF position. Open access door on left side of Amplifier-Oscillator chassis and install assigned frequency crystals.

(5) Place OPERATE-TUNE switch in TUNE position and RF Drive Control full counterclockwise.

(6) Place STANDBY ON-OFF switch in ON position.

(7) Place POWER ON-OFF switch in ON position and press START button.

NOTE

Green POWER ON light and red B+ ON lamps should light. If they do not light after a 30 second time delay, refer to Table 5-3.

CAUTION

If either light fails to operate, turn POWER switch OFF and recheck installation wiring and pilot lamps.

(8) Check all positions of METER SEL SWITCH for proper meter indications. (Refer to Table 3-1.)

(9) Turn RF DRIVE control slightly clockwise with METER SEL SWITCH on V303 CATHODE MA position. When milliameter reading increases slightly, check V305 CATHODE MA. If cathode current is not equal on V303 and V305 adjust grid bias resistors R321 and R324 (paragraph 6-4).

(10) Check all controls for proper operation.

(11) Use a frequency meter connected to J302 on front panel of RF Amplifier drawer, adjust Channel Frequency Adjustment Controls, R234 and R242, for proper frequency.

(12) Press transmitter STOP button.

(13) Connect an RF voltmeter across the dummy load in the Antenna Coupler. Set range to 300 volts.

NOTE

Transmitter can only be keyed by TRANSMITTER TEST button on front of Antenna Coupler when the access door of Antenna Coupler is open, unless interlock (S503) is by-passed. LOCAL-REMOTE switch must be in REMOTE.

(14) Place OPERATE-TUNE switch in OPERATE position and press transmitter ON switch.

WARNING

Do not touch voltmeter or dummy load leads at coupler while operating transmitter.

(15) Open small access door on left side of Amplifier-Oscillator chassis and adjust Oscillator Output Controls, R244 or R245, (for channel with crystal in place) full counterclockwise.

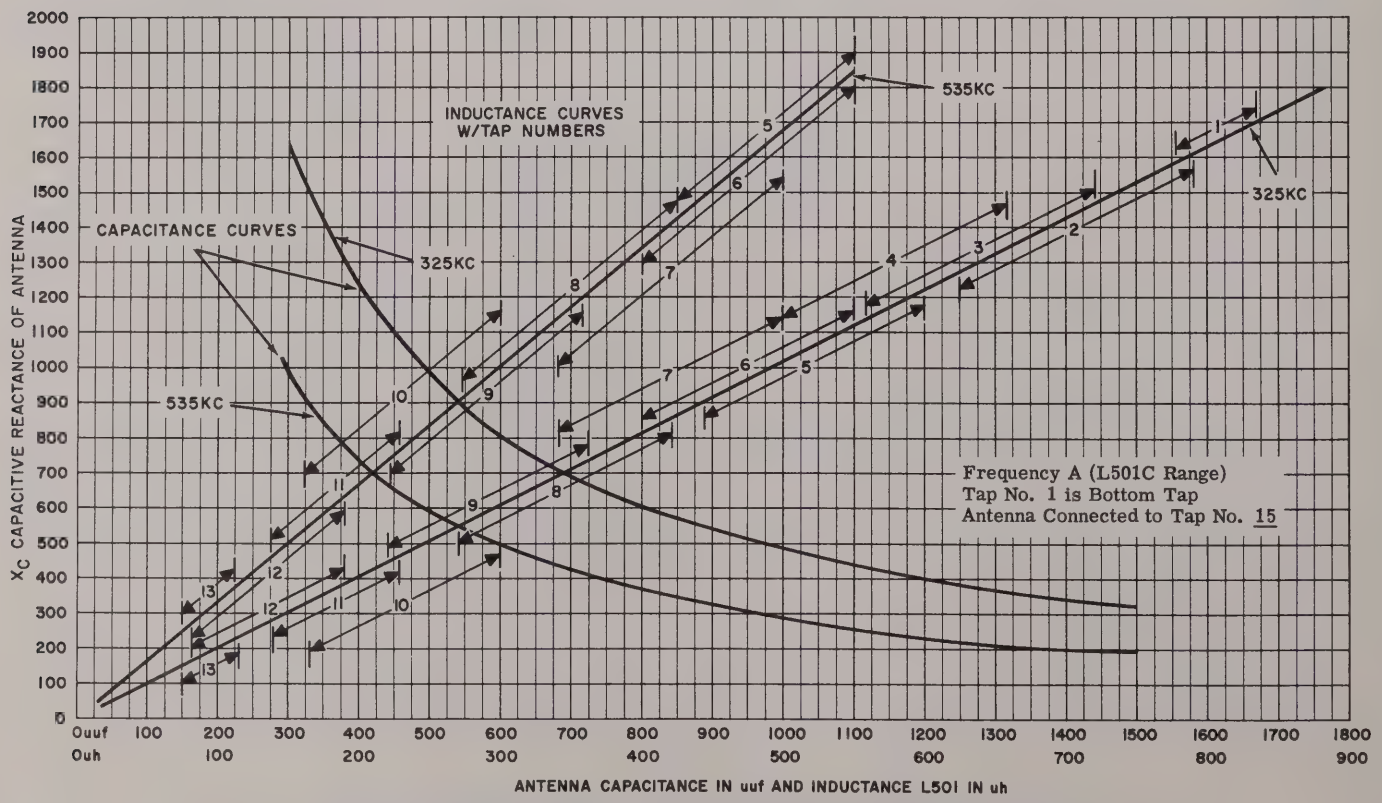



Figure 2-7. Antenna Coupler Load Calibration Curves (Sheet 1 of 5)

(16) Turn RF DRIVE control full clockwise. Press carrier switch and slowly adjust R244 (or R245) until RF voltmeter across dummy load indicates 189 volts. This adjustment insures that maximum output as controlled by external RF DRIVE control will not exceed 700 watts and damage transmitter.

CAUTION

Do not exceed 189 volts across dummy load for extended periods or final amplifiers may be damaged.

(17) Lock the adjustment on R244 (or R245) and recheck cathode current on V303 and V305. If current is unequal adjust for equal value (paragraph 6-4).

(18) Adjust R213 and R222 for selected % of modulation by trapezoid or other approved method.

(19) Install second assigned channel crystal and adjust R244 (or R245) as in steps (15), (16), (17) preceding. Adjust R207 for proper limiting.

(20) Transmitter is now ready for operation on frequency A and frequency B.

(21) Disconnect RF line (P503) from dummy load (J502) and reconnect to antenna coupler input (J503).

c. BALANCING OR ZEROING OF VSWR METER. This adjustment need be made only during installation or after repairs have been made.

(1) Disconnect P508 from J508 and reconnect to Dummy Load, J502.

(2) Place IND-CAL-OFF switch, S509, to CAL and key transmitter with TRANSMITTER TEST button and adjust R502 SWR CAL for full scale deflection of VSWR meter.

(3) Place S509 to IND, continuing to key the transmitter, and adjust SWR BALANCE ADJ, R503 for minimum deflection (1:1) of VSWR meter.

(4) Release TRANSMITTER TEST button and lock R503.

(5) Disconnect P508 from Dummy Load, J502, and reconnect to J508.

d. ANTENNA COUPLER ADJUSTMENTS WHEN ANTENNA IMPEDANCE IS KNOWN.

(1) Adjust and calibrate transmitter (paragraph b above) and place LOCAL-REMOTE switch in REMOTE.

(2) Inspect coupler to determine that antenna connection is to tap 15 (topmost terminal) on L501A.

(3) Switch to FREQ A position at transmitter.

(4) Select data from figure 2-7 to connect leads of L501C to taps on L501A.

Example:

(a) Channel frequency is 535 kc.

(b) Capacitance of antenna is 750 uuf.

(c) Locate 750 uuf on figure 2-7. Project vertically to intersect with 535 kc capacitance curve. Project this point horizontally to intersect with 535 kc inductance curve.

(d) Intersection occurs at tap 12. Connect lead from L501C to tap 12.

NOTE

If the curves of figure 2-7, sheets 1 or 2, do not indicate which tap should be connected, then move antenna connection from tap 15 to tap 12 and use the curves of figure 2-7, sheets 4 or 5.

(5) Move TUNE-OPERATE switch at transmitter to TUNE position.

(6) Insure that ANTENNA-OPEN-GROUND switch (S504) to antenna coupler is in ANTENNA position.

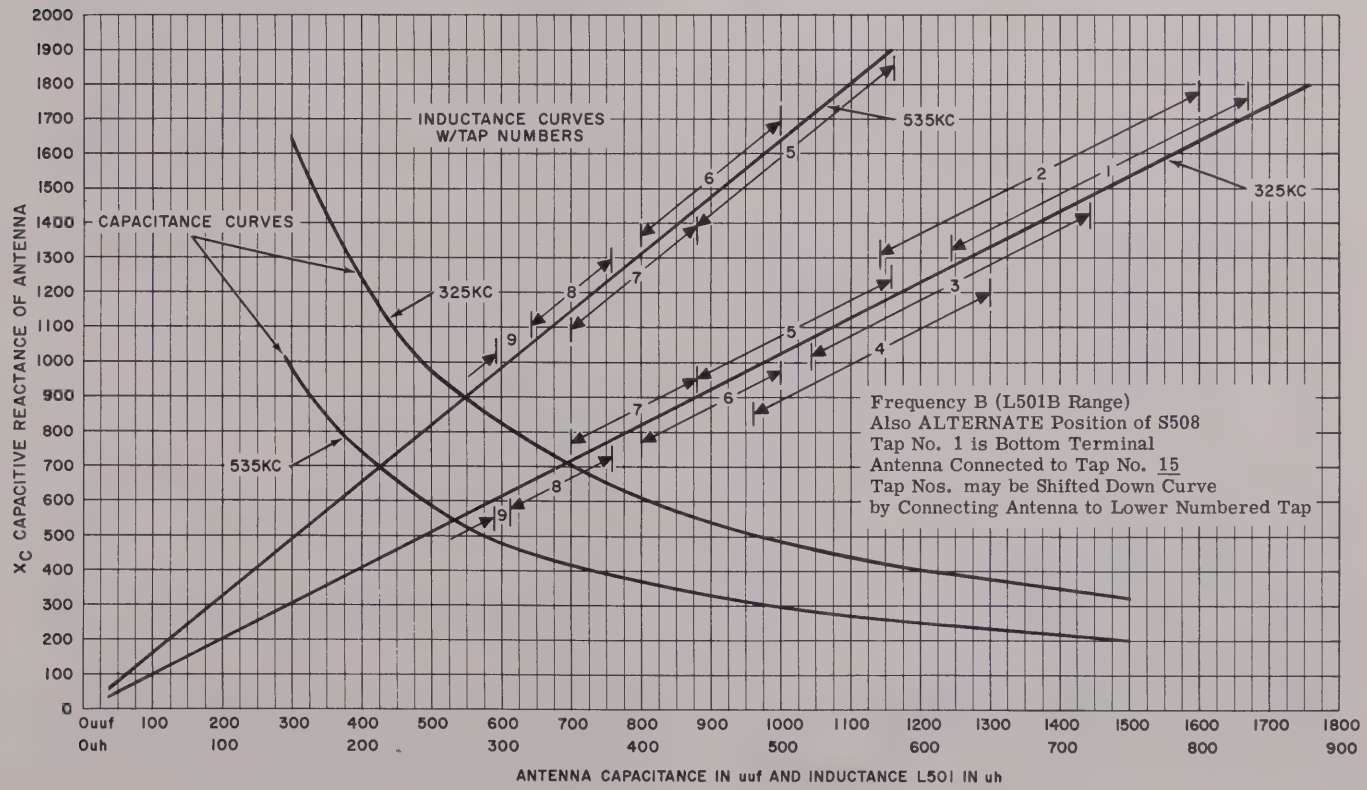



Figure 2-7. Antenna Coupler Load Calibration Curves (Sheet 2 of 5)

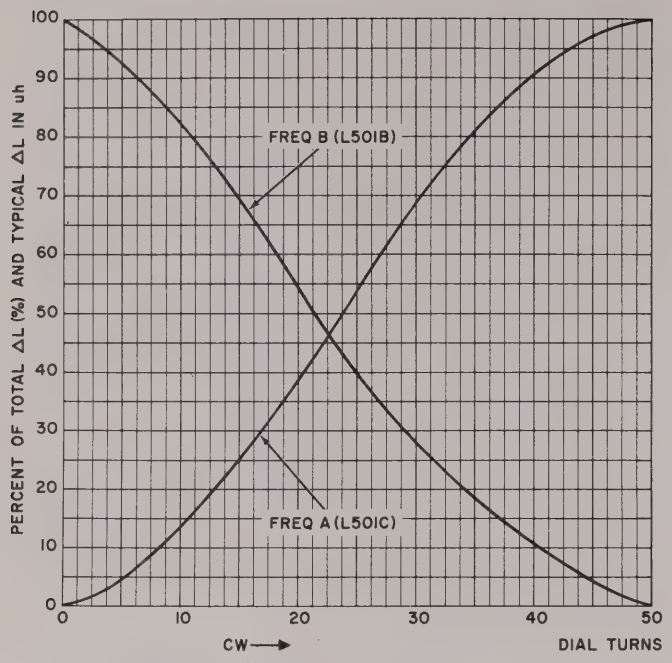



Figure 2-7. Antenna Coupler Load Calibration Curves (Sheet 3 of 5)

(7) Place the antenna coupler SWR CAL-IND-OFF switch (S509) in the CAL position.

(8) Use the SWR CAL knob to set full scale indication on the VSWR meter while keying transmitter with TRANSMITTER TEST button on front panel of antenna coupler.

(9) Place the antenna coupler CAL-IND-OFF switch in the IND position. Key transmitter and use the FREQ A FINE TUNE REACTANCE knob to obtain minimum standing wave ratio on the VSWR meter.

(10) Key transmitter and adjust FREQ A TUNE RESISTANCE switch (S507) for minimum VSWR indication.

(11) Alternately adjust FREQ A FINE TUNE REACTANCE and FREQ A TUNE RESISTANCE controls for minimum VSWR. VSWR should be less than 1.5 to 1 for optimum performance of equipment.

(12) When ready to transmit, move the transmitter TUNE-OPERATE switch to OPERATE position. Adjust the RF DRIVE CONTROL at the transmitter to obtain RF AMPS indication on the antenna coupler RF AMP meter corresponding to data listed in table 3-2.

Example: Ohmic value of antenna is 4 ohms. Desired output at antenna is 256 watts. Adjust RF DRIVE CONTROL to obtain an 8 ampere reading on the RF AMP meter.

(13) Repeat steps (7) through (11) for minimum VSWR and lock FREQ A FINE TUNE REACTANCE control.

(14) Repeat steps (4) through (13) above, for FREQ B. Use antenna coupler FREQ B - ALTERNATE TAP SWITCH in FREQ B position. Connect lead of L501B to proper tap on L501A. Record FREQ B control settings.

(15) If a known alternate frequency B is to be used, install known alternate crystal in FREQ B position in the transmitter. Place FREQ B - ALTERNATE TAP SWITCH at coupler in ALTERNATE position and tune as instructed in steps (4) through (13) above.

(16) When ALTERNATE FREQ tuning is completed, record settings and return FREQ B controls to those settings established in step (14) and lock controls.

e. ANTENNA COUPLER ADJUSTMENTS WHEN ANTENNA IMPEDANCE IS NOT KNOWN.

(1) Adjust and calibrate transmitter (paragraph b above) and place LOCAL-REMOTE switch in REMOTE.

(2) Inspect coupler to determine that antenna connection is to tap 15 (topmost terminal) on L501A.

(3) Switch to FREQ A position at transmitter.

(4) Move TUNE-OPERATE switch at transmitter to TUNE position.

(5) Place ANTENNA-OPEN-GROUND switch (S504) at antenna coupler in ANTENNA position.

(6) Connect lead from L501C to tap 1 of L501A.

(7) Place the antenna coupler CAL-IND-OFF switch in CAL position.

(8) Use the SWR CAL knob to set full scale indication of the VSWR meter while keying transmitter with TRANSMITTER TEST button on front panel of antenna coupler.

(9) Place the antenna coupler CAL-IND-OFF switch in the IND position.

(10) With lead from L501C connected to tap 1 of L501A, key transmitter and slew FREQ A FINE TUNE REACTANCE control through entire range. If no null is obtained in SWR meter repeat this step with lead attached to taps 2 through 15 in that order.

(11) When null is obtained on SWR meter, proper tap on L501A has been located; proceed as indicated in steps (10) through (13) in paragraph 2-5d above except set power for 700 watts maximum by adjusting RF DRIVE control full clockwise.

(12) Place TUNE-OPERATE switch at transmitter in TUNE position and repeat steps (7) through (11) above for FREQ B. Use antenna coupler FREQ B - ALTERNATE TAP SWITCH in FREQ B position. Connect lead of L501B to L501A taps. Record FREQ B control settings.

(13) If a known alternate frequency B is to be used, install known alternate crystal in FREQ B position in the transmitter. Place FREQ B - ALTERNATE TAP SWITCH at coupler in ALTERNATE position and tune as instructed in step (12) above.

(14) When ALTERNATE FREQ tuning is completed, record settings and return FREQ B controls to those settings established in step (12) and lock controls.

## 2-6. PREPARATION FOR RESHIPMENT.

If necessary to reship the transmitter or coupler, observe the following items:

a. Disconnect all power, control, keying, and RF cables from the transmitter.

b. Check that all tubes, tube shields and crystals are properly secured in their sockets.

c. Secure all panel covers, and filters so that they will not shake loose.

d. Package and preserve the transmitter and coupler equipment spares in accordance with current specifications.

e. Mark the outer cases with the required shipping information, and in the cases containing the technical manuals, include the following: one set of test records, two technical manuals, one set of servicing diagrams and one set of installation drawings. Mark crate with words "Technical Manuals Inside".

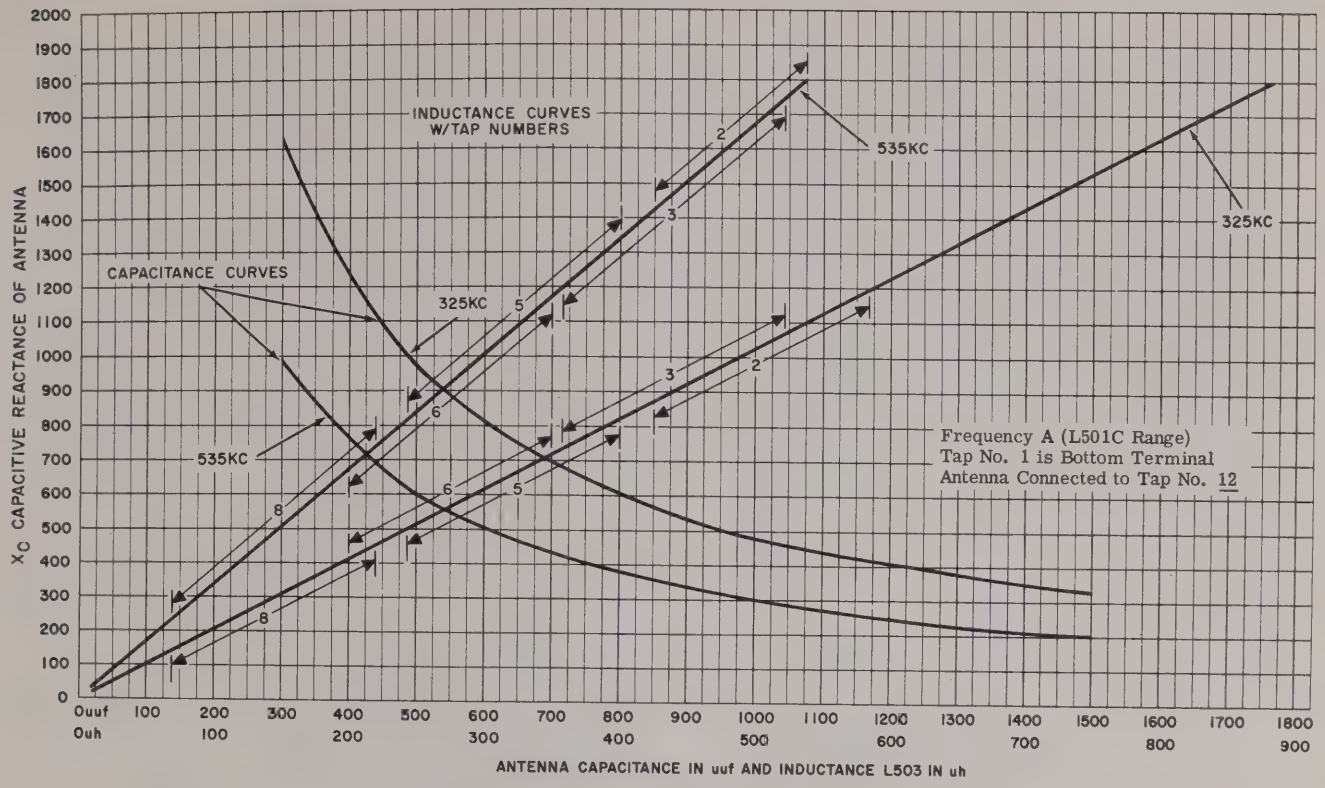



Figure 2-7. Antenna Coupler Load Calibration Curves (Sheet 4 of 5)

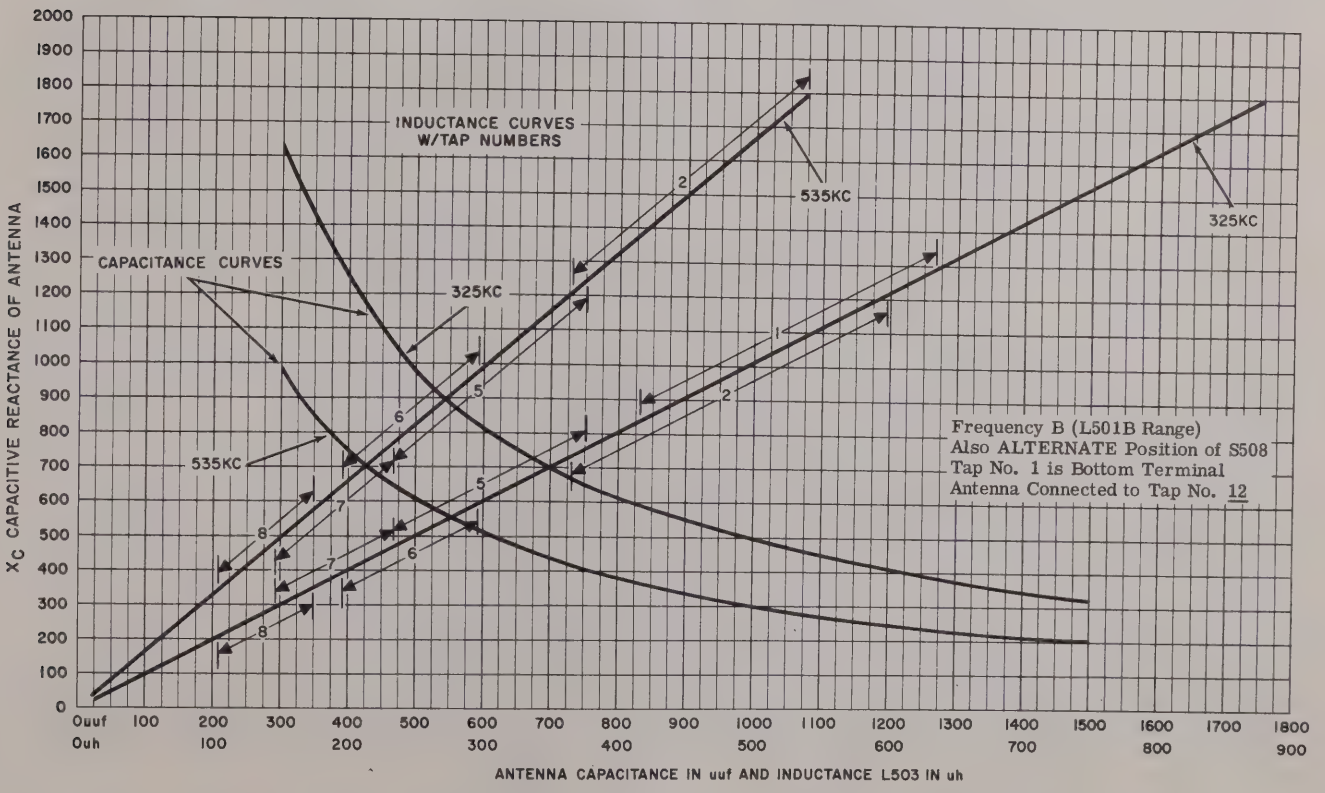



Figure 2-7. Antenna Coupler Load Calibration Curves (Sheet 5 of 5)

# SECTION 3

# OPERATOR'S SECTION

## 3-1. FUNCTIONAL OPERATION.

a. The transmitter and coupler are capable of producing 500 watts of power for radio frequency signals between 325 and 535 kc/s. They are designed for continuous operation at full power output and are capable of continuous wave telegraphy (A1), telegraphy modulated at audio frequency (A2), and amplitude modulation (A3). Changeable crystals are used for frequency selection. With two installed operating crystals, the transmitter is capable of being rapidly shifted from a call frequency to a working frequency.

b. The output impedance of the transmitter is 52 ohms, and the external antenna coupler is used to match the antenna to the transmitter.

c. Two meters are located on the front panel of the transmitter. One for filament voltage readings on the final amplifiers, the second for critical current values in the amplifiers. These meters can be used to monitor circuits in the transmitter, and should be used to check equipment performance. Two meters are also located on the antenna coupler; one for RF current values and one for the VSWR.

d. The characteristics and quality of the output signal generated from the transmitter can be controlled from the front panel. Adjustments should be performed only by qualified personnel.

## 3-2. PREPARATION FOR USE.

Once the equipment is correctly installed and adjusted no further preparations for use are required.

## 3-3. OPERATING PROCEDURES.

a. TRANSMITTER CONTROLS. — Controls located on the panels of the transmitter components (figure 3-1) are as follows:

(1) "MAIN POWER" SWITCH CB101. — This control connects or disconnects 220 volt line supply voltage to the transmitter. If current drawn is excessive, this circuit breaker will automatically open to disconnect power.

(2) "START-STOP" SWITCH S101. — This control applies filament voltage to the tubes immediately and applies plate power, after a suitable delay, through time delay relay TD101.

(3) "STANDBY" SWITCH S103. — This switch is provided to permit application of filament voltage independent of the START-STOP switch. This allows short "shut-down" periods while maintaining the transmitter in a "ready" or "standby" condition.

(4) "LOCAL-REMOTE" SWITCH S202. — This control allows operation from a remote location when the switch is in the REMOTE position. A Navy 6-wire control system must be wired to the terminal board TB401 at the bottom of the transmitter. The 6-wire system provides control of start-stop, remote keying, remote channel select, remote modulation and remote overload reset.

(5) "MODE" SWITCH S204. — The modulation control must be in the MCW position for internal modulation; in the CW position for Type A1 transmission and VOICE position for remote modulation.

(6) "CARRIER" SWITCH S201. — The carrier switch is used to control the carrier frequency momentarily (KEY position) or maintain a continuous carrier (ON position). Use of this switch is determined by the type of transmission.

(7) "RF DRIVE" CONTROL. — This control is used to vary the transmitter power output between 100 and 700 watts. Calibration of this control must be done in conjunction with a voltage measurement on the antenna coupler dummy load.

(8) "TUNE-OPERATE" SWITCH S301. — This switch is used to reduce the power output of the transmitter to permit testing and tuning of the antenna coupler and transmitter.

(9) "FREQ A, FREQ B" SWITCH S203. — This switch is used to change from one installed crystal oscillator to another. Frequency A is normally 500 kc/s. Frequency B is normally a frequency between 400 and 500 kc/s.

(10) "METER SEL SW" SWITCH S302. — This switch connects a milliameter M102 in various circuits to monitor currents. The currents are for cathode, grid, plate circuits and are listed in Table 3-1.

(11) "OVERLOAD" RESET BUTTON S102. — This button is used to reset overload relay K103 in the event of an overload in the amplifier. If the overload relay opens, press the reset button momentarily. If overload condition continues, perform trouble shooting procedures.

(12) "HEADPHONE" JACKS J205 AND J507. — The two HEADPHONE jacks located on the front panels of the Amplifier-Oscillator and Antenna Coupler respectively are interconnected for the use of sound-power phones during tuning operations.

b. ANTENNA COUPLER CONTROLS. — Controls located on the antenna coupler (figure 3-2) are as follows:

(1) "IND-CAL-OFF" SWITCH S509 - This switch is used to connect the calibration circuit of R502 and the VSWR meter for tuning. The VSWR meter is calibrated by placing S509 in the CAL position and adjusting R502 for fullscale indication. In the IND position, the fine tuning coils L501B or L501C are adjusted to achieve a 1.3:1 (or better) indication on the VSWR meter.

(2) "SWR CAL" CONTROL R502 — This control is used when S509 is in CAL position to obtain fullscale deflection of the VSWR meter. R502 establishes the signal level fed to the VSWR meter which is used as a reference level.

(3) "DIMMER" CONTROL R501. — This control varies the brightness of the coupler panel lights.

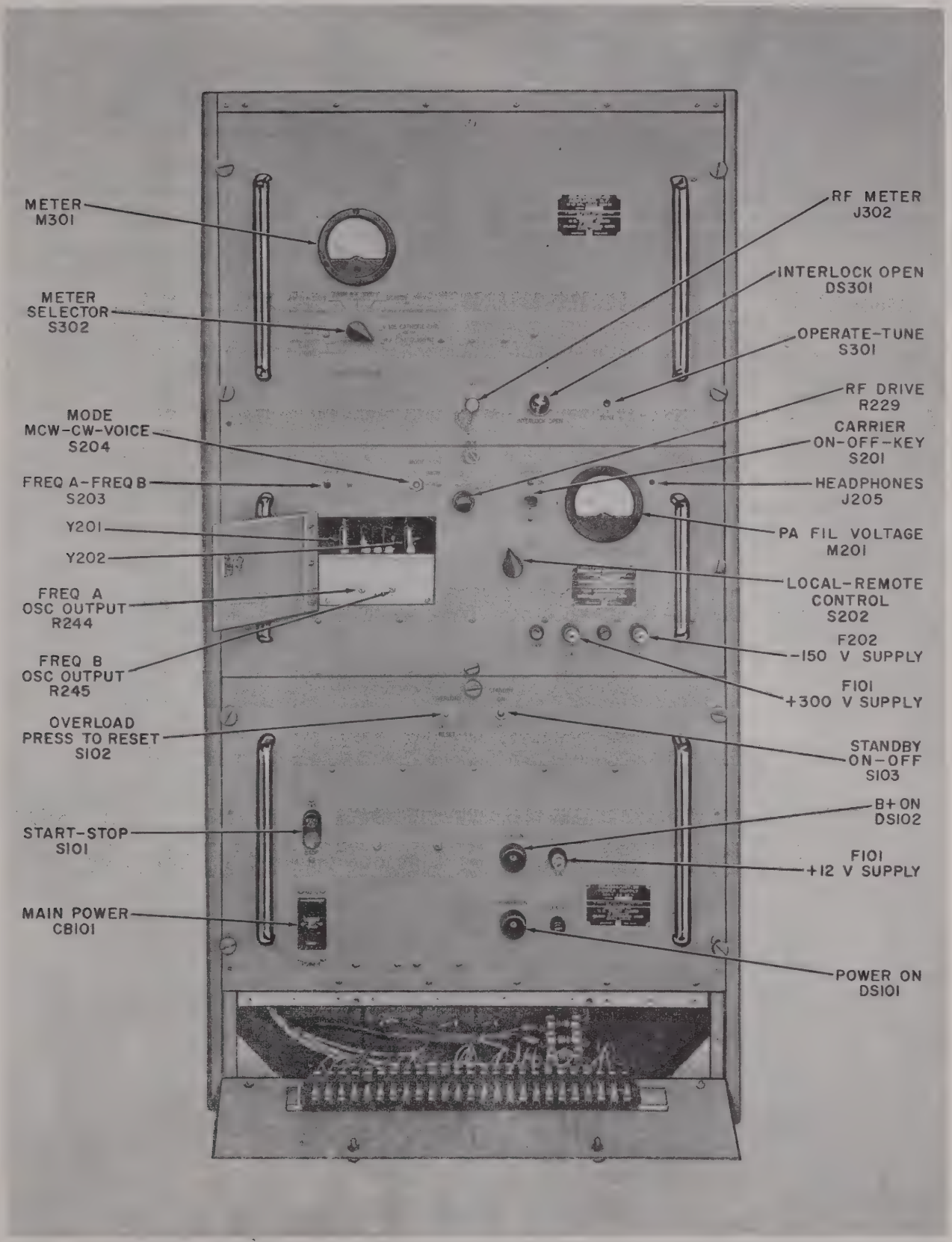



Figure 3-1. Radio Transmitter, AN/URT-20 Controls

(4) "FREQ A TAP" SWITCH S506. -- This switch selects the tap on primary of transformer T501 which gives the best match of antenna resistance to transmission line impedance (minimum VSWR).

(5) "FREQ B TAP" SWITCH S507. -- This switch is the same as S506 except it is used for FREQ B selection.

NOTE

Position of FREQ A - FREQ B selector on the transmitter panel controls solenoid switch S501. The position of switch S501 determines which switch (S506 or S507) to use for calibration.

WARNING

Do not cheat interlock switch S503! If coupler door interlock is cheated, the transmitting set can be keyed at the transmitter or the remote control, causing lethal voltages to be present in the coupler.

(6) "FREQ A FINE TUNE REACTANCE" CONTROL L501C. -- This control is a vernier device used to introduce inductive reactance on the secondary of T501. The tuning coil is adjusted for the best VSWR indication on meter M502 for FREQ A transmission.

(7) "FREQ B FINE TUNE REACTANCE" CONTROL L501B. -- This control is used as described in step (6) preceding when tuning for FREQ B transmission.

(8) "ANTENNA CURRENT" SWITCH S505. -- This switch is used when necessary to read the RF AMPS, to the antenna, on meter M501.

(9) "TRANSMITTER TEST SWITCH: S502. -- This keying switch permits keying of the transmitter from the antenna coupler.

(10) "ANT-OPEN-GRD" SWITCH S504. -- This

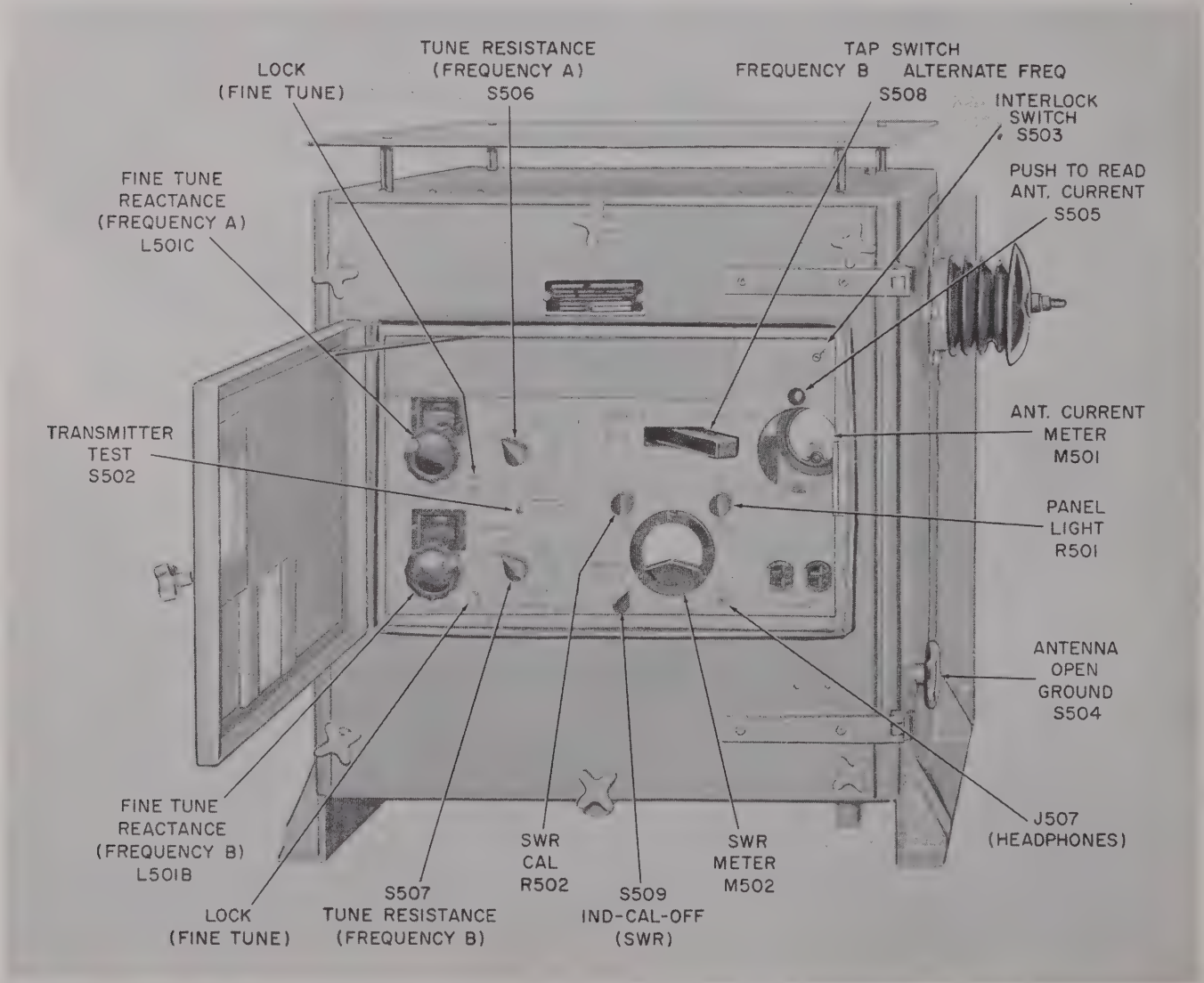



Figure 3-2. Antenna Coupler CU-1064/URT-20 Controls

switch is used to open, ground, or connect the antenna to the antenna coupler output.

(11) "FREQ B - ALTERNATE" SWITCH S508 — This switch when properly connected (paragraph 2-5d (14)) permits using an alternate FREQ B without manually changing the taps at L503.

c. SEQUENCE OF OPERATION. — After initial installation (paragraph 2-4) and initial check and adjustment (paragraph 2-5) the sequence of operation is as follows:

(1) Install crystal for assigned frequency of FREQ A and FREQ B to which equipment has been tuned.

(2) Place MAIN POWER switch CB101 in ON position. Green POWER ON light will glow.

(3) Press START button S101. Filament voltage will be applied to the transmitter tubes. After approximately 30 seconds the red B+ light will glow indicating plate voltage is applied to the tubes.

(4) Check for proper indications using METER SEL SW. Refer to Table 3-1 for values.

(5) Use LOCAL-REMOTE SWITCH in desired position and use local or remote key for operation. Use Navy 6-wire system for remote operation.

(6) Select desired frequency using FREQ A - FREQ B switch.

(7) If new crystal frequencies are being used, check and adjust transmitter and coupler (paragraph 2-5).

(8) Transmitter and coupler are ready for operation.

d. METER READINGS. — Tables 3-1 and 3-2 list all necessary meter readings along with comments regarding possible variations.

e. ADJUSTMENTS. — Adjustments required prior to operation are included in paragraph 2-5 step d. Periodic checks for the proper values may require readjustments to compensate for aging of components. Keep a record of all values for comparitive purposes.

f. RF OUTPUT. — Due to close proximity of station being worked, it may be necessary to reduce RF drive to eliminate unnecessary interference on frequency. Experience will develop feeling for proper RF output under the various operating conditions.

g. PRECAUTIONS. — Investigate and correct any of the following conditions.

(1) Meter readings not within limits (Table 3-1).

(2) Fluctuating or erratic meter readings other than those caused by normal keying.

(3) Indications of abnormal noises, unusual odors, arcing or high temperatures.

(4) Improperly radiated signals as observed on a monitor receiver.

WARNING

Never make any internal repairs or adjustments with the equipment in operation unless specifically authorized. Observe precautions as instructed in the text.

## 3-4. SUMMARY OF OPERATING PROCEDURES.

A description of controls and the operating sequence is included in paragraph 3-3. Complete familiarization and understanding of the sequence is mandatory before actual operation.

## 3-5. EMERGENCY OPERATION.

a. OTHER THAN NORMAL. — A malfunction within the transmitter requires that the transmitter be

TABLE 3-1. TRANSMITTER PANEL METER READINGS

| METER M301 (Controlled by Meter Select Switch) | | | |
|---|---|---|---|
| POSITION | SWITCH MARKING | METER READINGS | REMARKS |
| 1 | OFF | None | |
| 2 | Bias Supply | -190V | ±5% |
| 3 | V303 Grid Bias | -130V | Adjusted by R321 to control cathode current |
| 4 | V305 Grid Bias | -130V | Adjusted by R324 to control cathode current |
| 5 | Low B+ 300V | +300V | ±5% |
| 6 | High B+ 3000V | +3000V | ±5% |
| 7 | Screen +750V | +750V | ±3% |
| 8 | V303 Cathode MA | 0-320 MA | Position 8 and 9 values must be equal |
| 9 | V305 Cathode MA | 0-320 MA | Actual current value depends on RF DRIVE CONTROL setting |
| 10 | RF AMPS | 0-3.7 AMP | Value depends on RF DRIVE CONTROL setting |
| 11 | | | Not used |
| 12 | | | Not used |
| METER M101 (Monitors Final Amplifier Filament Voltage) meter reading to be 5 volts | | | |

removed from service and repaired. Do not operate with abnormal voltage or current indications. If the antenna coupler is producing abnormal arcing that cannot be corrected by nominal adjustments, it may be possible to reduce the transmitter power output to eliminate the arcing for emergency use.

## 3-6. OPERATOR'S MAINTENANCE.

a. OPERATOR'S CHECKS AND ADJUSTMENTS. — The operating checks and adjustments (paragraphs 3-2 and 3-3) will be performed prior to starting operation and only to the extent necessary for normal operation. When the crystal frequencies are changed (new frequency) adjust only as necessary using procedures prescribed in paragraph 2-5.

b. ROUTINE CHECK CHARTS. — Use data in Table 3-3 to check and inspect this equipment. Revise this chart as necessary depending on local directives and the particular installation.

c. EMERGENCY MAINTENANCE. — Emergency maintenance will be confined to tightening loose connections, repairing frayed wire insulation, cleaning and the like. Internal defects will be corrected only by trained maintenance personnel.

d. PARTS REPLACEMENT. — The operator shall confine replacement of parts to tubes, fuses and lamps specifically authorized by the local repair authority. Identification of parts is included in Section 7 of this manual.

TABLE 3-2. ANTENNA COUPLER METER READINGS

| METER M501 (Press to Read Antenna Current) | | | | | |
|---|---|---|---|---|---|
| RF AMMETER INDICATION | WATTS INPUT TO ANTENNA | | | | |
| | ANTENNA LOAD VALUE | | | | |
| AMPERES | 2 OHM | 4 OHM | 6 OHM | 8 OHM | 10 OHM |
| 1 | 2 | 4 | 6 | 8 | 10 |
| 2 | 8 | 16 | 24 | 32 | 40 |
| 3 | 18 | 36 | 54 | 72 | 90 |
| 4 | 32 | 64 | 96 | 128 | 160 |
| 5 | 50 | 100 | 150 | 200 | 250 |
| 6 | 72 | 144 | 216 | 288 | 360 |
| 7 | 98 | 196 | 294 | 392 | 490 |
| 8 | 128 | 256 | 384 | 512 | 640 |
| 9 | 162 | 324 | 486 | 648 | 910 |
| 10 | 200 | 400 | 600 | 800 | --- |
| 11 | 242 | 484 | 726 | --- | --- |
| 12 | 288 | 576 | --- | --- | --- |
| 13 | 338 | 676 | --- | --- | --- |
| 14 | 392 | 784 | --- | --- | --- |
| 15 | 450 | --- | --- | --- | --- |

| METER M502 (Voltage Standing Wave Ratiometer) | |
|---|---|
| METER INDICATION | REMARKS |
| 1:00 (optimum condition)<br>1:2 (normal condition)<br>1:5 (minimum condition) | Coupler must be tuned to match transmitter impedance. Operate as near optimum condition as possible. |

TABLE 3-3. ROUTINE CHECK CHART

| WHAT TO CHECK | HOW TO CHECK |
|---|---|
| Daily: | |
| Check external appearance. | Visually check for obvious defects. Pay particular attention to unusual noises, odors or abnormal heating. |
| Meter readings. | Compare meter readings with recorded data and optimum values specified in Table 3-1. A gradual change in readings may indicate a possible point of eventual trouble. |
| Weekly: | |
| Check all above items plus air filters. | Remove filters, shake out dirt, wash and allow to air dry. Replace filters when defective. |
| Monthly: | |
| Perform daily and weekly checks: inspect operation of controls and instruments. | During operation observe action of controls and instruments. If controls are loose or meters provide erratic operation initiate repairs. |
| Wiring and internal components. (Shut off power to the transmitter). | Open bottom panel and inspect wiring at TB401. Inspect for loose connections, tighten as necessary. Inspect for frayed, cut or otherwise damaged insulation on wiring. Pull out each drawer in turn and inspect for overheated, loose, broken or otherwise damaged parts. Tighten cable connectors by hand. Remove dust, dirt and the like with a vacuum source, brushes, cleaning solvent and lint free cloth. |

# SECTION 4

# PRINCIPLES OF OPERATION

## 4-1. FUNCTIONAL DESCRIPTION.

a. GENERAL. — The transmitter consists of three separate sections; each section mounted on a removable chassis. The three sections are: a power supply, an amplifier-oscillator, and a final power amplifier (figure 4-1). The transmitter output is fed through the antenna coupler to the transmitting antenna. The coupler is used to provide an impedance match between the transmitter and the antenna for optimum output (minimum transmission line loss).

b. POWER SUPPLY. — An external power source of 220 volt (±10%), 50/60 cycle (±5%), 3-phase is required by the transmitter. This input power is applied to the power supply through an ON-OFF circuit breaker. The power supply develops the necessary working voltages such as filament supply, plate supply and the like required for operation (See figure 4-2.). The power supply also includes the necessary switches for starting, stopping, overload protection, as well as time delay relays, indicator lights and the like to provide circuit protection and indicate the on-off condition of critical circuits.

c. AMPLIFIER-OSCILLATOR. — The amplifier-oscillator section (figure 4-3) is used to develop the RF output for the FREQ A and FREQ B. The selected frequencies are developed by using quartz crystals in the grid circuit of the RF oscillator tubes V204 and V205. The output of the oscillators is amplified and applied to the power amplifier section. The amplifier-oscillator also includes the audio oscillator and audio amplifier for type A2 transmission. Keying relays for on-off control of the carrier are incorporated in this chassis.

d. POWER AMPLIFIER. — The output of the amplifier-oscillator section is of relatively low level and is further amplified (figure 4-3) by the linear power amplifier stage. This section uses a linear push-pull power amplifier to increase the output to a maximum of 700 watts. This output is controlled by an RF driver which can decrease the output to a minimum of 100 watts by controlling the output of the RF driver feeding the final power amplifier.

## 4-2. FUNCTIONAL SECTIONS OF THE TRANSMITTER.

a. GENERAL. — The transmitter and coupler utilize conventional circuits for operation. A brief summary of each section is included in the following paragraphs.

b. POWER SUPPLY. — The 220 volt, 3-phase input to the transmitter passes through a filtering network FL401, FL402 and FL403 and is applied to the power supply through circuit breaker CB101. The voltages within the transmitter are developed by the following:

(1) One secondary of transformer T101 provides 115 volts ac for the convenience outlets and the panel lamps on the antenna coupler. An additional secondary output is rectified by CR101 and CR102 to provide a 12 volt dc output.

(2) Transformers T102, T103 and T104 provide the 3000 volt high B+ for plate supply on power amplifier tubes V303 and V305. The transformer output is rectified by diodes CR103 through CR168. Resistors R105 through R170 maintain a safe operating potential on the diodes. The current draw in

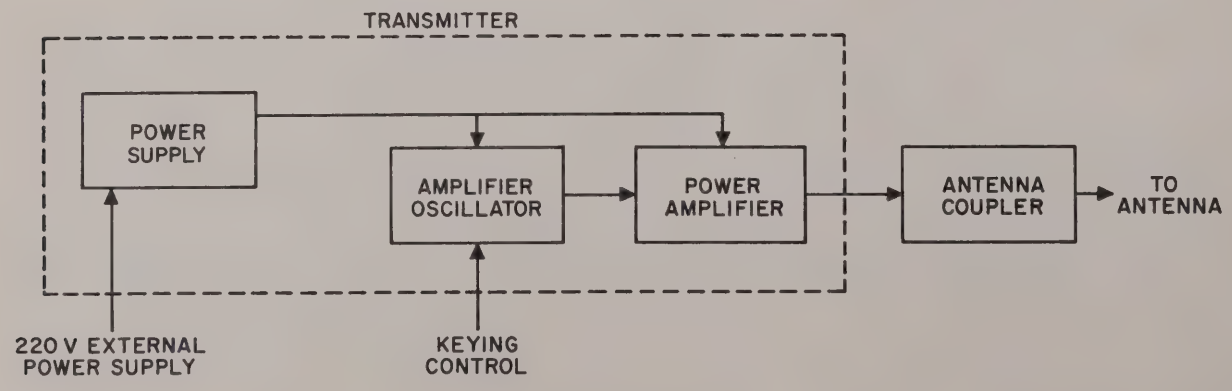



Figure 4-1. Transmitter and Antenna Coupler Component Block Diagram

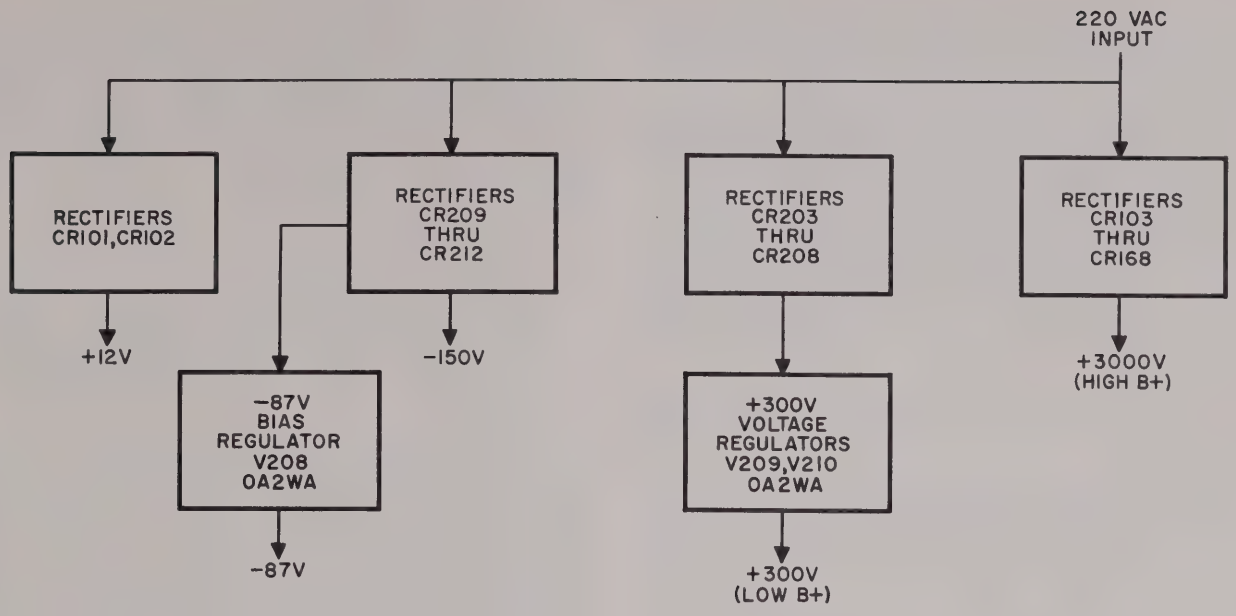



Figure 4-2. Power Supply Distribution Block Diagram

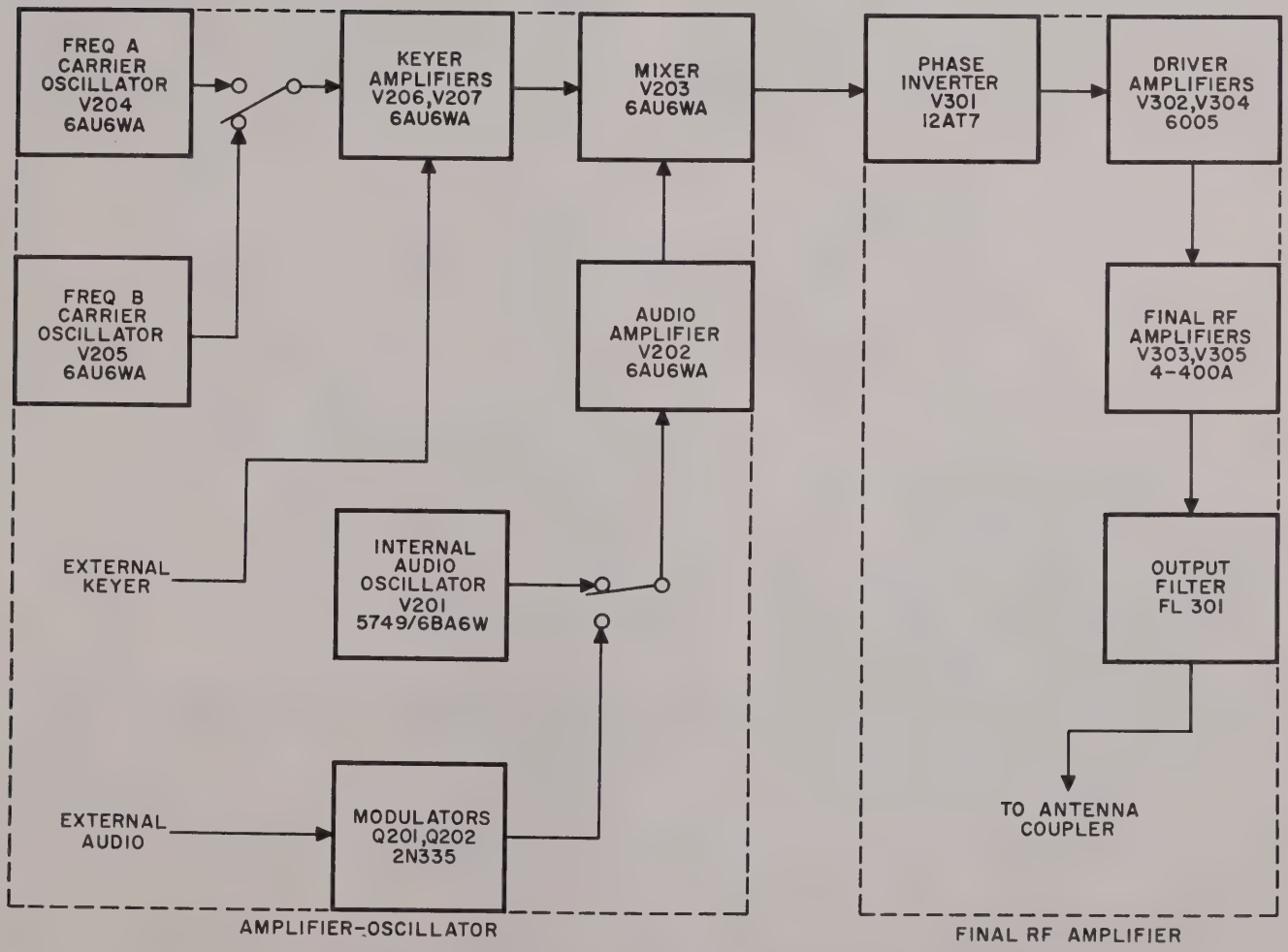



Figure 4-3. Transmitter Block Diagram

this high voltage supply is monitored by overload relay K103. If overload relay trips, the circuit is reset by pressing the RESET button on the power supply panel.

(3) Transformer T206 and diodes CR203 through CR208, installed on the amplifier-oscillator chassis, develop the low B+ voltage (300 volts) regulated by tubes V209 and V210.

(4) Transformer T207 and diodes CR209 through CR212, also on the amplifier-oscillator chassis, develop a -150 volt bias voltage regulated by V208. In addition this transformer develops a 6.3 filament voltage and a metered 5 volt power amplifier cathode voltage.

(5) The input power ON condition is indicated by a green panel lamp DS101. The high voltage (3000 volt) ON condition is indicated by red panel lamp DS102.

c. AMPLIFIER-OSCILLATOR SECTION. — The amplifier-oscillator section includes the following:

(1) The two carrier frequencies are developed by tubes V204 and V205; each tube using a quartz crystal in the grid circuit (figure 4-4). The actual RF frequency can be changed by changing the crystal. A clip for three spare crystals is located between tubes V204 and V205. The crystals use two pins at the base and are held at the top by a spring clip.

(2) The output of the oscillators V204 and V205 is applied to RF amplifiers V206 and V207. This amplifier circuit is also used as a keying circuit using keying relay K204 to impose a high B+ voltage on the screen grid potential of V206 and V207.

(3) The amplified RF signal is applied to mixer tube V203. The output of the mixer is fed to the power amplifier driver V301. Audio oscillation occurs at V201 when the modulation relay K202 is energized. This audio oscillation is applied to audio amplifier V202. The carrier frequency from V204 or V205 and the audio frequency from V201 are then fed through mixer V203 to the power amplifier stage.

NOTE

When remote modulation control is used, the audio modulation is fed into transformer T201. The filter network and modulation output transformer T203 apply the audio signal to amplifier V202, bypassing audio oscillator V201.

(4) An external modulation frequency is applied to transformer T201. The frequency is passed through the band pass filter consisting of the capacitance and inductance network on the primary of T202. This band pass filter will pass 300 to 3000 cycle frequencies. The output of the filter is fed through output transformer T203. A clipper (CR201 and CR202) is used across the secondary of T203 to restrict the output level of the modulating frequencies. Variable resistor R207 is used as a linearity control. Variable resistor R213 is used to control the percent of modulation.

d. POWER AMPLIFIER SECTION. — The amplified output from the amplifier-oscillator is applied to the Class A power amplifier through input transformer T301 located on the power amplifier chassis.

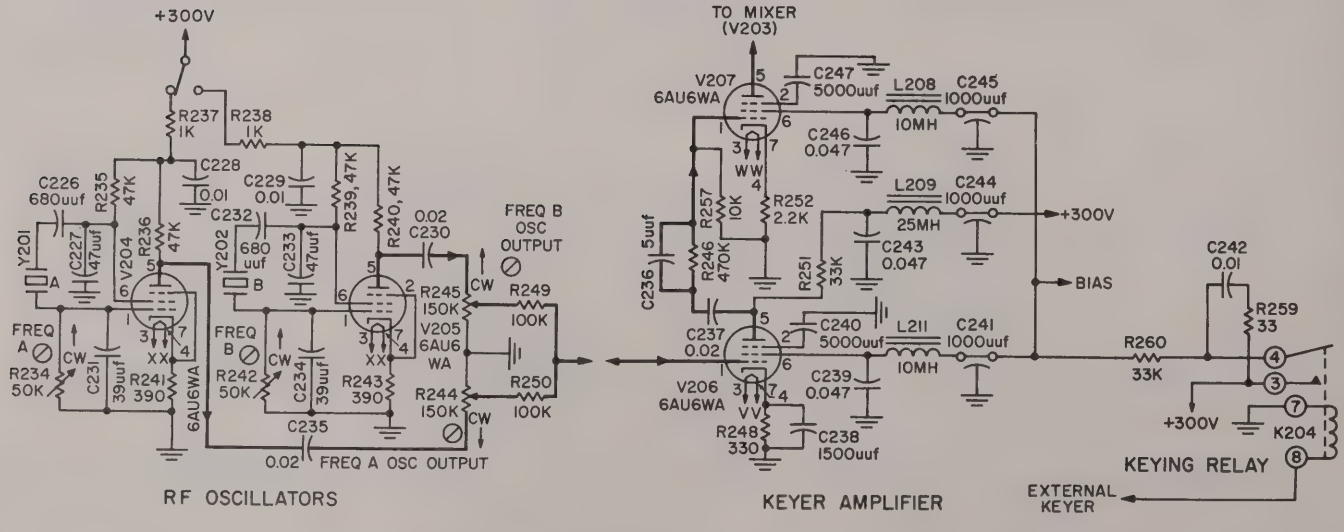



Figure 4-4. Partial Schematic Diagram of RF Oscillator, Amplifier and Keying Circuit

(1) The output signal from mixer V203 is controlled by RF Drive Control R229. The signal is applied to a phase inverter V301 used to control the grid potential on the push-pull operated driver amplifiers V302 and V304.

NOTE

The TUNE-OPERATE switch S301 is used in the grid circuit of V301 to reduce the power output level when tuning procedures are necessary. The switch removes the high positive grid potential to operate the tube near cut-off for tuning (figure 4-5).

(2) The push-pull driver amplifiers V302 and V304 provide the final amplification of the signal applied to the power amplifiers V303 and V305. The output of V303 and V304 is transformer coupled to the power amplifier through transformer T302. Critical adjustment of the cathode current on V303 and V305 is necessary for maximum linearity and is accomplished by control resistors R321 and R324. Adjustment of these resistors for equal cathode current is mandatory.

(3) The power amplifier output is applied to output transformers T303 and T304. The primary windings are series connected while the secondary windings are parallel connected. The output of this transformer network is applied to a current transformer T305 used to monitor the RF current using METER SEL switch S302 and meter M301. The output is passed through a filtering network FL301 to remove harmonics then applied to the antenna coupler.

(4) Terminal 4A on output transformer T304 is electrically connected to the plate of V305 as shown on the schematic. It appears, however, to be physically connected to T303. Terminal 4A on T304 is connected through terminal 4A and T303 case only and not part of the electrical function of T303. This is necessary due to the design factors covering plate lead lengths.

## 4-3. FUNCTIONAL SECTIONS OF ANTENNA COUPLER.

a. GENERAL. — The antenna coupler is used to match the 52-ohm transmission line to the impedance of the antenna. The coupler is designed to match antennas having a capacitive reactance of 300 to 1200 picofarad and a resistive component of 2 to 10 ohms.

b. DUMMY LOAD. — To permit tuning the transmitter a simulated antenna load is used. The load is 52 ohms pure resistance to simulate optimum conditions. This load is not used for normal operation.

c. COUPLER NETWORK (Z501) - The current flowing through the primary of Z501 induces a voltage

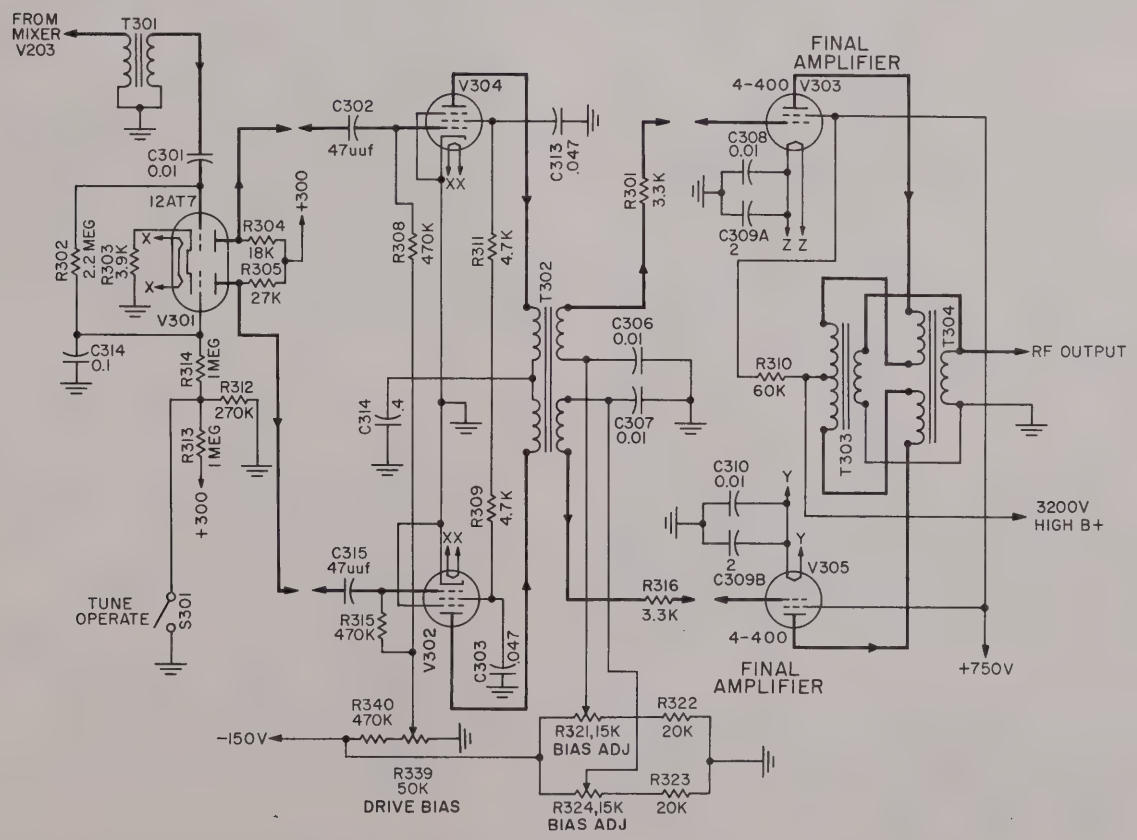



Figure 4-5. Partial Schematic of RF Amplifier Circuit

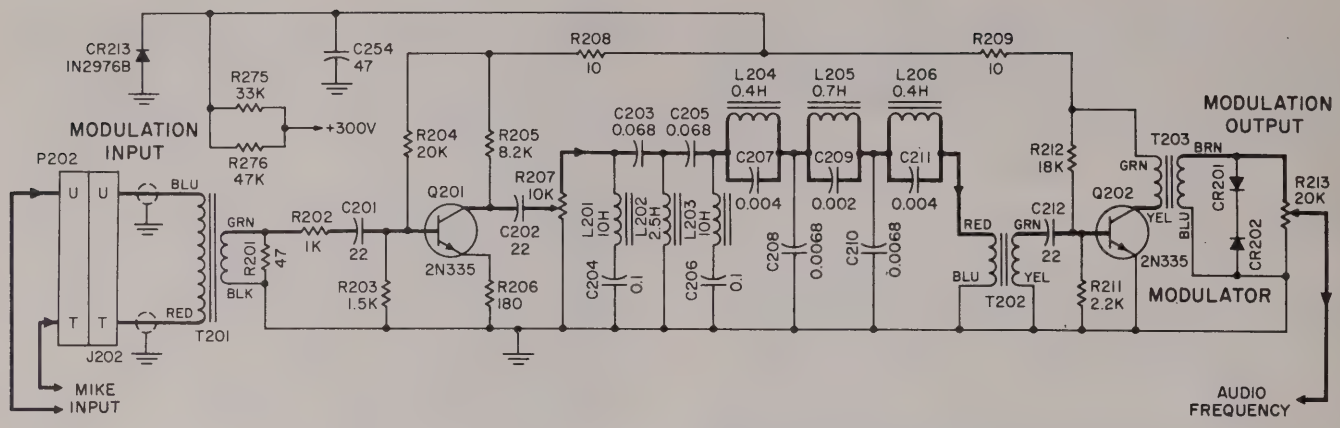



Figure 4-6. Partial Schematic of Printed Circuit Modulator

in the secondary which is applied to the voltage divider R503 through R506 when S509 is in CAL. Due to the phasing and balanced relationship of the secondary with respect to incident and reflected power; the proportional incident voltage is impressed at the meter circuit when S509 is in CAL position and the proportional reflected voltage is impressed at the meter circuit when S509 is in IND position. Proper balancing is obtained by initial adjustment of R503. The induced RF energy derived from either the incident or reflected power is rectified by CR503. Filtering is provided by C502, C503, and R507. Resistor R508 completes the DC path of the half wave rectification circuit. CR501 and CR502 protect the meter M502 from excessive current.

d. TRANSFORMER (T501). — The transformer T501 is used as the coupling transformer between the input to the antenna coupler and the output to the transmitting antenna. Switches S506 and S507 are tap switches used to select the proper tap on the primary. The selection of the proper tap depends on the frequency of the carrier. Switch S501 is solenoid actuated and is controlled by the FREQ A, FREQ B switch on the transmitter. When transmitting on FREQ A, switch S507 is used to select the primary tap and inductance L501C is used to tune the secondary. When transmitting on FREQ B, switch S506 and inductance L501B are used for tuning.

e. INDUCTANCE (L501). — The capacitive reactance of the antenna is offset by selecting a tap on L501A (figure 2-5) and using L501B or L501C for fine tuning. The fine tuning affect of L501B or L501C is indicated on the VSWR meter M502 when switch S509 is in the IND position. FREQ B -ALTERNATE switch S508 is used to permit quick changing from FREQ B (which requires corresponding change in inductance tap L501A) to an alternate frequency by switching to the preselected load tap on L501A which corresponds to that alternate frequency.

f. METER (M501). — The RF amperes output to the antenna are indicated on meter M501. By adjusting the transmitter RF DRIVE control for a specified value of RF current on meter M501 (and known antenna load) the watts output at the antenna can be controlled (See Table 3-2.).

## 4-4. FUNCTION OF MODULATORS

a. PRINTED CIRCUIT BOARD MODULATOR — The mike input is fed to the base circuit of Q201 through transformer T201. (Figure 4-6). Q201 is a standard grounded emitter amplifier. The output can be adjusted by R207. From R207, the signal is then fed through the overlapping high pass-low pass (band pass) filter network whose characteristic impedance is 10,000 ohms with a band pass of 300 to 2500 cycles. The output of the filter fed through interstage transformer T202 is applied to the base circuit of grounded emitter amplifier Q202. Output transformer T203 couples the signal to the clipper formed by CR201 and CR202. R213 adjusts the level of the signal output for proper plate modulation. CR213 provides B+ regulation for the two transistor stages. Ext Modulation Relay K203 couples the signal to Audio Amplifier V202 and Mixer V203 when MODE switch S204 is in VOICE position.

b. 800 CYCLE MODULATOR — The circuit of V201 (Figure 4-7) is a simple phase shift oscillator with a portion of the plate output being fed back through C215 to the grid circuit. R218 provides adjustment of the frequency to 800 cycles. R222 adjusts the output level for proper plate modulation. Int Modulation Relay K202 switches B+ to the circuit when MODE switch S204 is in MCW position.

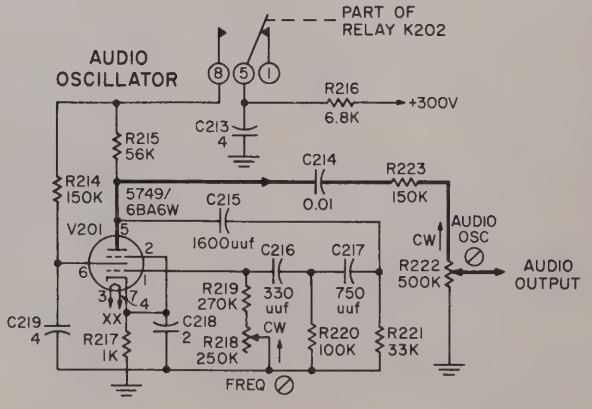



Figure 4-7. Partial Schematic of 800 Cycle Modulator

# SECTION 5

# TROUBLE SHOOTING

## 5-1. GENERAL.

Supplement the trouble shooting procedures with information contained in NAVSHIPS 91828, Handbook of Test Methods and Practices. Perform a thorough visual inspection before attempting measurements and tests.

## 5-2. TEST EQUIPMENT.

Test equipment to be used is tabulated in Table 5-1 and referred to in the text.

## 5-3. OVERALL TROUBLE SHOOTING.

a. CONTROL SETTINGS. — Refer to paragraph 2-5 and establish a control setting arrangement for a normal operating condition.

b. VISUAL INSPECTION. — Perform a thorough visual inspection to avoid unnecessary lengthy test procedures. Indicating lights and meters are used on the transmitter in critical circuits to indicate circuit conditions that affect overall operation.

WARNING

Disconnect all power before inspecting.

(1) Inspect input power connections to transmitter. (See figure 2-5.)

(2) Inspect condition of line fuses F401, F402 and F403.

(3) Inspect condition of all circuit fuses. A lighted fuse lamp indicates a blown fuse. Fuses are installed for removal from front of panels. (See figure 3-1.)

(4) Inspect condition of all cable connectors. Be sure each is tight. Inspect cables for cut, worn, wet or otherwise damaged condition.

(5) Inspect for proper interconnections. (See figures 2-4, 2-5 and 2-6.)

(6) Pull out each chassis and inspect condition of tubes. Inspect for burned or charred areas indicating overheating and circuit breakdown.

(7) Clean all dust, dirt or other foreign matter from chassis, terminals and leadwires with a vacuum source.

(8) Inspect for broken, cut, frayed or otherwise damaged internal leadwires. Be sure all connections are tight.

c. TROUBLE SHOOTING.

(1) Analyze the trouble before performing any tests. Refer to Table 5-3 for typical troubles and use the trouble report to aid in isolating the trouble area.

(2) The trouble shooting chart provides a signal tracing sequence to check each section of the transmitter. If adequate RF and audio signals can be traced through the transmitter, then the transmitter is in working order.

NOTE

If all meter readings listed in Table 3-1 are satisfactory, all components shown in figure 5-1 are eliminated from the trouble area.

d. VOLTAGE AND RESISTANCE DIAGRAMS. — When trouble shooting indicates a defect such as a short, open circuit or the like, use the data in Table 5-4, figures 5-2 and 5-3 to locate the defect.

WARNING

Use extreme care when performing point to point measurements. Do not assume the high B+ voltage is OFF at anytime.

## 5-4. TYPICAL TROUBLES.

Typical troubles are tabulated in Table 5-3. Use the data in this table before performing extensive tests.

## 5-5. LOCATION OF PARTS.

Figures 5-4 through 5-8 illustrate the individual parts within the transmitter and the coupler. Reference designation symbols are the same as those used on the schematic diagrams.

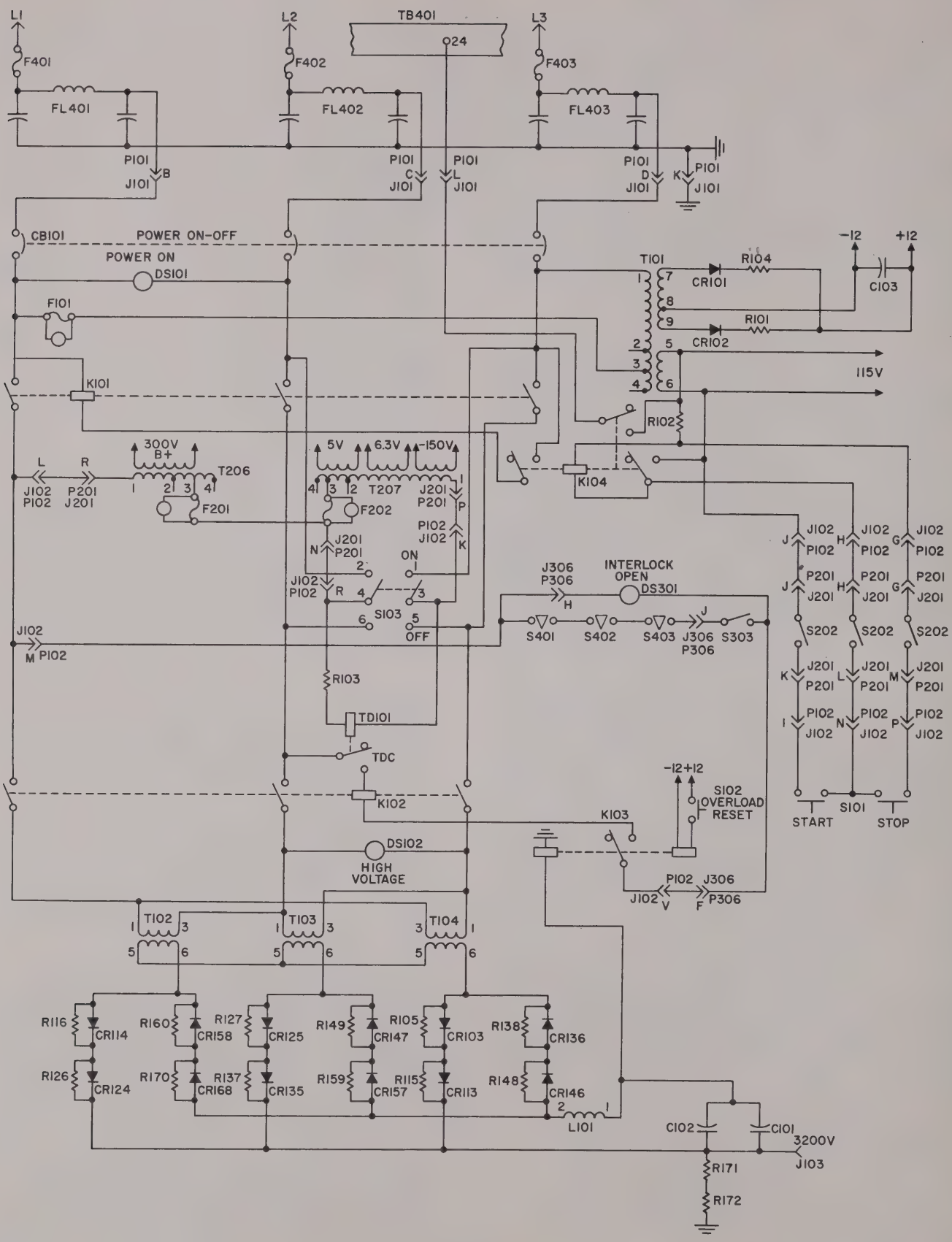



Figure 5-1. Primary Power Supply Distribution Schematic Diagram

TABLE 5-1. TEST EQUIPMENT

| NAME | DESIGNATION | PURPOSE |
|---|---|---|
| Vacuum Tube Voltmeter | ME-25/U or equivalent | General purpose ac/dc and resistance measurements |
| Audio Oscillator ±0.01% accuracy | TS-382/U series | Frequency measurements in audio range |
| Multimeter | AN/USM-162 or equivalent | General purpose ac/dc and resistance measurements |
| Oscilloscope capable of audio (800 cps) and RF (300-600 KC/S) measurement and voltage amplitude measurement | OS-8/U series or AN/USM-117 | To signal trace RF and audio modulation through transmitter |
| RF Range Frequency Meter ±0.01% accuracy | AN/URM-82 or equivalent | Frequency measurement in radio telegraphy band |
| Transistor Tester | TS-2086/U | To test transistors |

TABLE 5-2. TROUBLE SHOOTING CHART

| STEP | TEST POINT | PRELIMINARY ACTION | NORMAL INDICATION | NEXT STEP |
|---|---|---|---|---|
| 1 | | Connect the RF output P503 to the dummy load J502. Set all panel controls to establish a normal operating sequence. Refer to paragraph 2-5 and 3-2. | | |
| 2 | | Pull out top two chassis of transmitter, bypass the interlock switches and press START button. | Power ON lamp will light, filaments will light. | If transmitter is completely dead, refer to Table 5-3. |
| 3 | 1 | Use METER SEL SWITCH S302 and meter M301 to check for values specified in Table 3-1.<br><br>NOTE: Close top two chassis to check 3000V circuit. Open chassis after measuring. | Meter readings must be as specified in Table 3-1. | If readings are abnormal refer to Table 5-3 to locate possible defective part. |
| 4 | 2 | Connect a properly calibrated oscilloscope or frequency meter to RF meter jack J302 to read RF frequency. | | |

TABLE 5-2. TROUBLE SHOOTING CHART (CONT)

| STEP | TEST POINT | PRELIMINARY ACTION | NORMAL INDICATION | NEXT STEP |
|---|---|---|---|---|
| 5 | | Press START button switch to FREQ A. | Oscilloscope or frequency meter will indicate RF frequency of installed FREQ A crystal. | If frequency is incorrect recheck with a new crystal. If frequency is still incorrect use voltage-resistance data to check circuit of V204. |
| 6 | | Switch to FREQ B. | Oscilloscope or frequency meter will indicate frequency of installed FREQ B crystal. | If frequency is incorrect recheck with new crystal. If still incorrect, use voltage-resistance data to check circuit of V205. |
| 7 | 3 | Move oscilloscope test lead to grid of V203. | Scope will indicate amplified RF value of FREQ B. | If signal is attenuated or not present, use resistance-voltage data to check circuits of V206 and V207. |
| 8 | | Switch to FREQ A. | Scope will indicate amplified RF value of FREQ A. | Same as step 7 above. |
| 9 | 4 | Move oscilloscope lead to connector J204. | Scope will indicate amplified RF value of FREQ A. | If signal is missing check for defective control R229, transformer T205 or capacitor C260. |
| 10 | 5 | Connect an Audio oscillator to terminal 22 of TB401 switch to external Modulation on. Apply 800 cycles signal. Connect oscilloscope to J204. | Oscilloscope should indicate a modulated RF signal. | If signal is missing or badly distorted, use an oscilloscope to check from transformer, T203 to transformer T201 to locate faulty component. Adjust R207 for minor distortion |
| 11 | 5 | Same as step 10 except remove Audio oscillator switch to Internal Modulation on. | Same as in step 10. | If signal is missing check circuit of V-201. If scope image is not modulated, check tube V202 and transformer T-204. If pattern is not the same as step 10 adjust R-222. Adjust R-218 for 800 cycles if required. |
| 12 | 6 | Move oscilloscope to grid #2 of V301. Reconnect P204 to J204; switch to INTERNAL MODULATION ON. | Scope will indicate RF signal with modulated envelope as in step 10. | If signal is missing, check transformer T301 and interconnect cable between J303 and J204. |
| 13 | 7 | Move oscilloscope lead to grid of V302. | Same as step 12. | If signal is missing, check for defect between V301 and V302. |
| 14 | 8 | Move oscilloscope lead to grid of V304. | Same as step 12. | If signal is missing, check for defect between V302 and V303. |

TABLE 5-2. TROUBLE SHOOTING CHART (CONT)

| STEP | TEST POINT | PRELIMINARY ACTION | NORMAL INDICATION | NEXT STEP |
|---|---|---|---|---|
| 15 | 9 | Move oscilloscope lead to grid of V305. | Same as step 13. | If signal is missing, check for defect between V304 and V303. |
| 16 | 10 | Connect Antenna Coupler to transmitter. Close all drawers on transmitter. | Use METER SEL SWITCH to read RF AMPS on transmitter. Press the press to test button on Antenna Coupler to read RF amperes to antenna. | If the signal has stopped between step 15 and 16, check transformer T303, T304 and interconnections from T304 to the antenna coupler. If the RF ammeter on the antenna coupler indicates the transmitter signal is reaching the coupler, transmission should be normal if coupler is properly tuned to antenna. |

TABLE 5-3. TYPICAL TROUBLES

| TROUBLE | NATURE OF TROUBLE | SYMPTOMS |
|---|---|---|
| Transmitter completely dead | 1. Blown fuses F401, F402, F403.<br>2. Open line filter FL401, FL402, FL403. | Power to transmitter satisfactory. Tubes do not light, fans do not operate. Indicating lamps do not operate. |
| Transmitter partially operative | 1. Fuse F101 open. (Check for short on secondary of T103.)<br>2. Transformer T103 defective.<br>3. Relays K101 or K103 defective. | Power ON light operative. Tube filaments light with STANDBY switch in ON position. No low B+ supply voltage. |
| Low B+ (300V) inoperative | 1. Fuse F201 open. (Check for short on secondary of T206.)<br>2. Transformer T206 defective. | Power ON light operates. High voltage light operates. Filaments light. |
| No filament (6.3V) voltage | 1. Fuse F202 open. (Check for short on secondary of T207.)<br>2. Transformer T207 defective. | Power ON light operates. No grid bias voltage, no PA voltage.<br><br>WARNING: Plate voltage is available under the above condition. Turn transmitter off immediately. |
| High B+ (3000V) inoperative | 1. Interlock S401, S402, S403 open.<br>2. Fan blower switch S303 open.<br>3. Overload relay K103 in overload condition.<br>4. Relays K102 or TD101 defective.<br>5. Resistor R103 open. | All other voltages available as indicated on M301. HIGH VOLTAGE light OFF. |
| High B+ (3000V) inoperative | 1. Transformer T102, T103, T104 defective.<br>2. Choke L101 open. | Conditions same as above except HIGH VOLTAGE light is ON. |

TABLE 5-4. POWER SUPPLY VOLTAGE CHART

| TB401 | | | | |
|---|---|---|---|---|
| FROM TERMINAL | TO TERMINAL | VOLTAGE | CONDITION | FUNCTION |
| 1 | 4 | 0V<br>115Vac | Local<br>Remote | Remote Start |
| 2 | 12 | 0V<br>115Vac | Local<br>Remote | Remote Start |
| 3 | 12 | 0V<br>115Vac | Local<br>Remote | Remote Stop |
| 4 | 12 | 115Vac | | 115 Volt Line |
| 5 | Ground | 0V | | Remote Key |
| 6 | Ground | 12Vdc | | 12Vdc Line |
| 7 | Ground | 0Volts | Grounded | -12Vdc Line |
| 8 | Ground | 0Volts | | Int. Mod. Relay |
| 9 | Ground | 0Volts | | Freq. Select Relay |
| 12 | 4 | 115Vac | | 115 Volt Line |
| 13 | Ground | +12Vdc<br>0V | Local<br>Remote | To Coupler Interlocks |
| 14 | Ground | 0V | | Keying Relay |
| 16 | 4 | 115Vac<br>0V | Freq B<br>Freq A | Coupler Channel Select |
| 17, 18 | Ground | 0V | | Headphone |
| 19 | Ground | 0V | | Overload Reset |
| 20 | 4 | 0V<br>115Vac | Freq B<br>Freq A | Coupler Channel Select |
| 21 | Ground | 0V | | Ext. Mod. Relay |
| 22, 23 | Ground | 0V | | Ext. Mod. Input |
| 24 | 12 | 115Vac | When On | Remote "ON" Indicate |

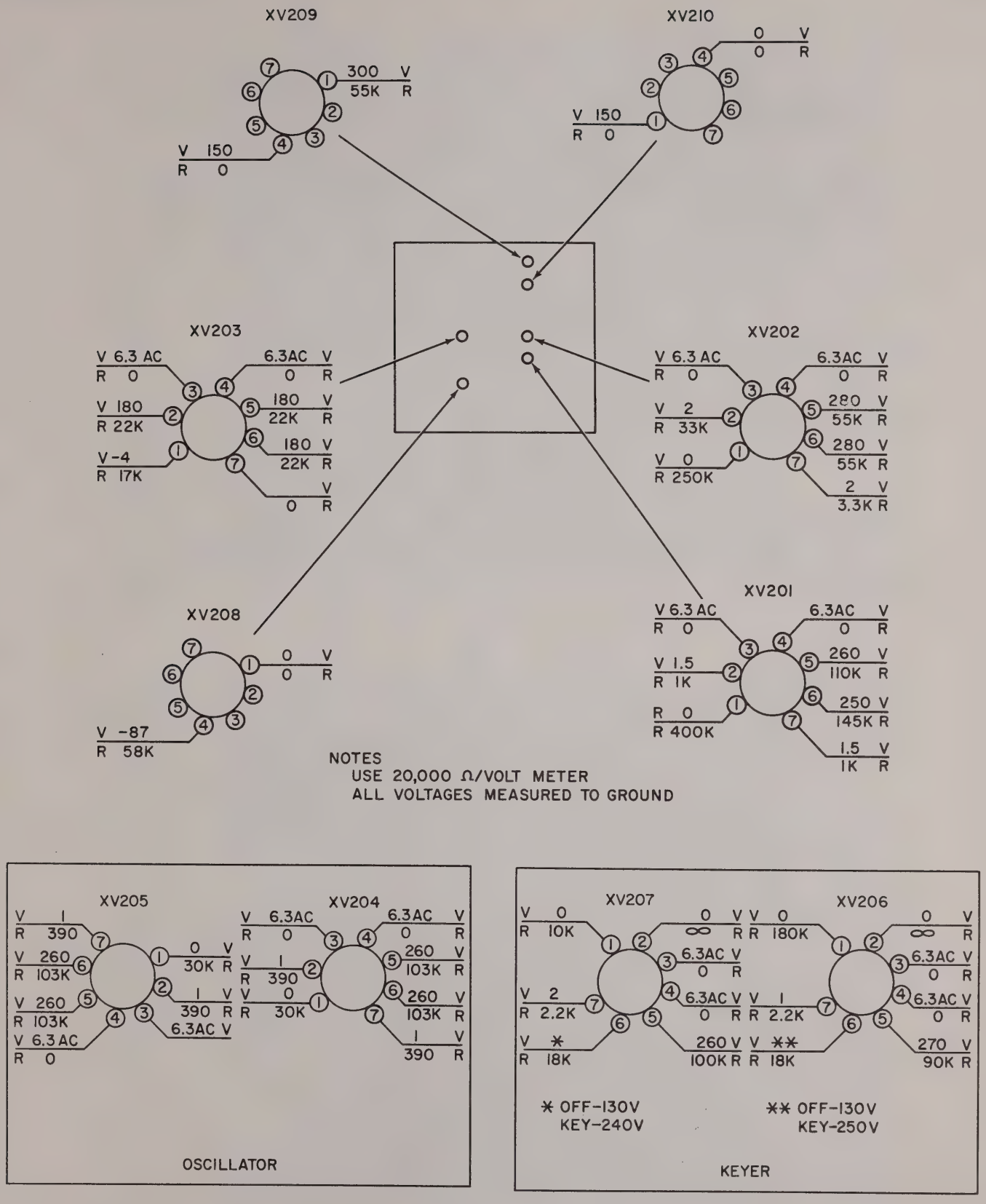



Figure 5-2. Amplifier-Oscillator Chassis AM-3340/URT-20
Resistance and Voltage Measurements

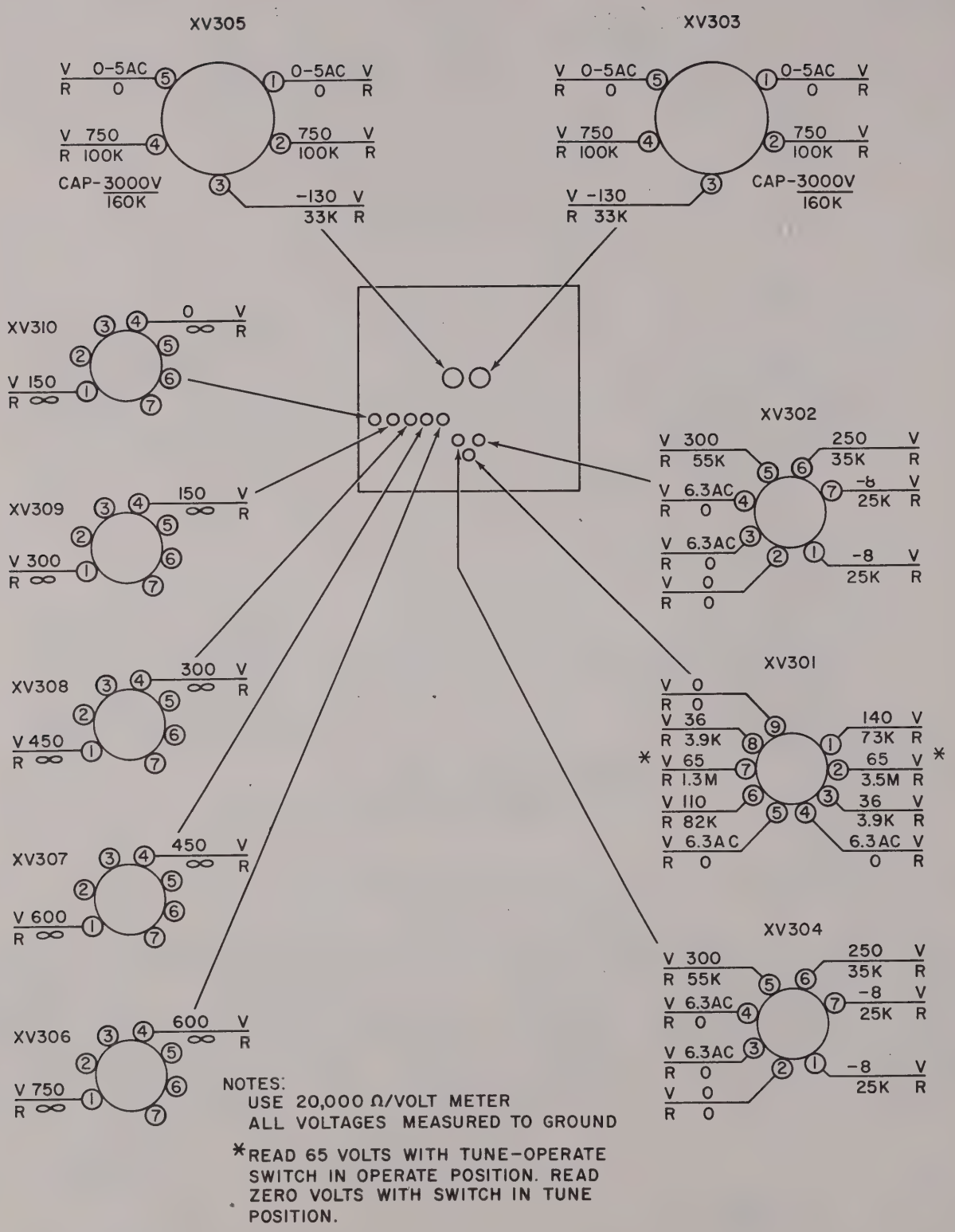



Figure 5-3. Radio Frequency Amplifier Chassis AM-3341/URT-20
Resistance and Voltage Measurements

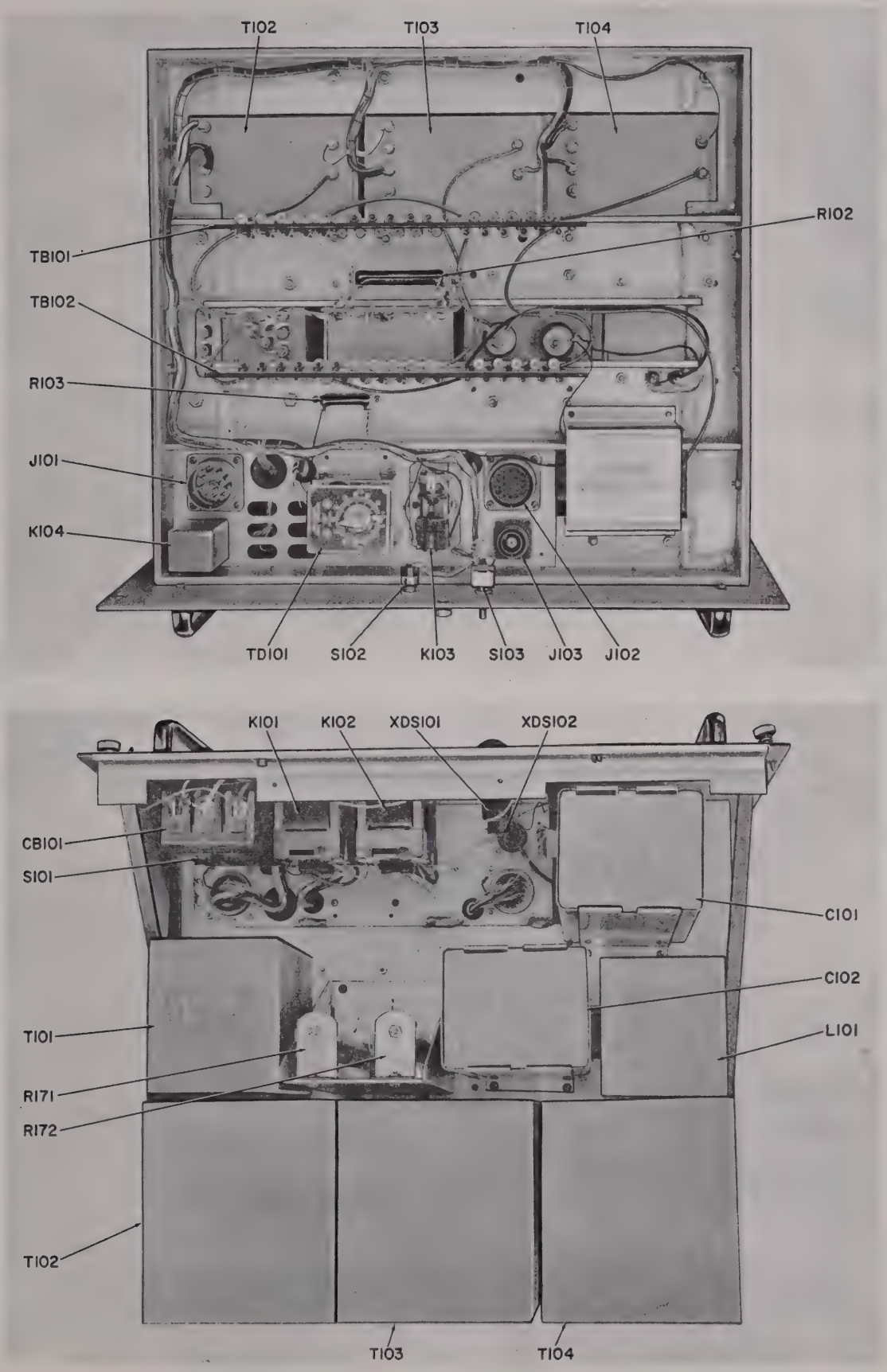



Figure 5-4. Power Supply Chassis PP-3385/URT-20
Parts Location Views

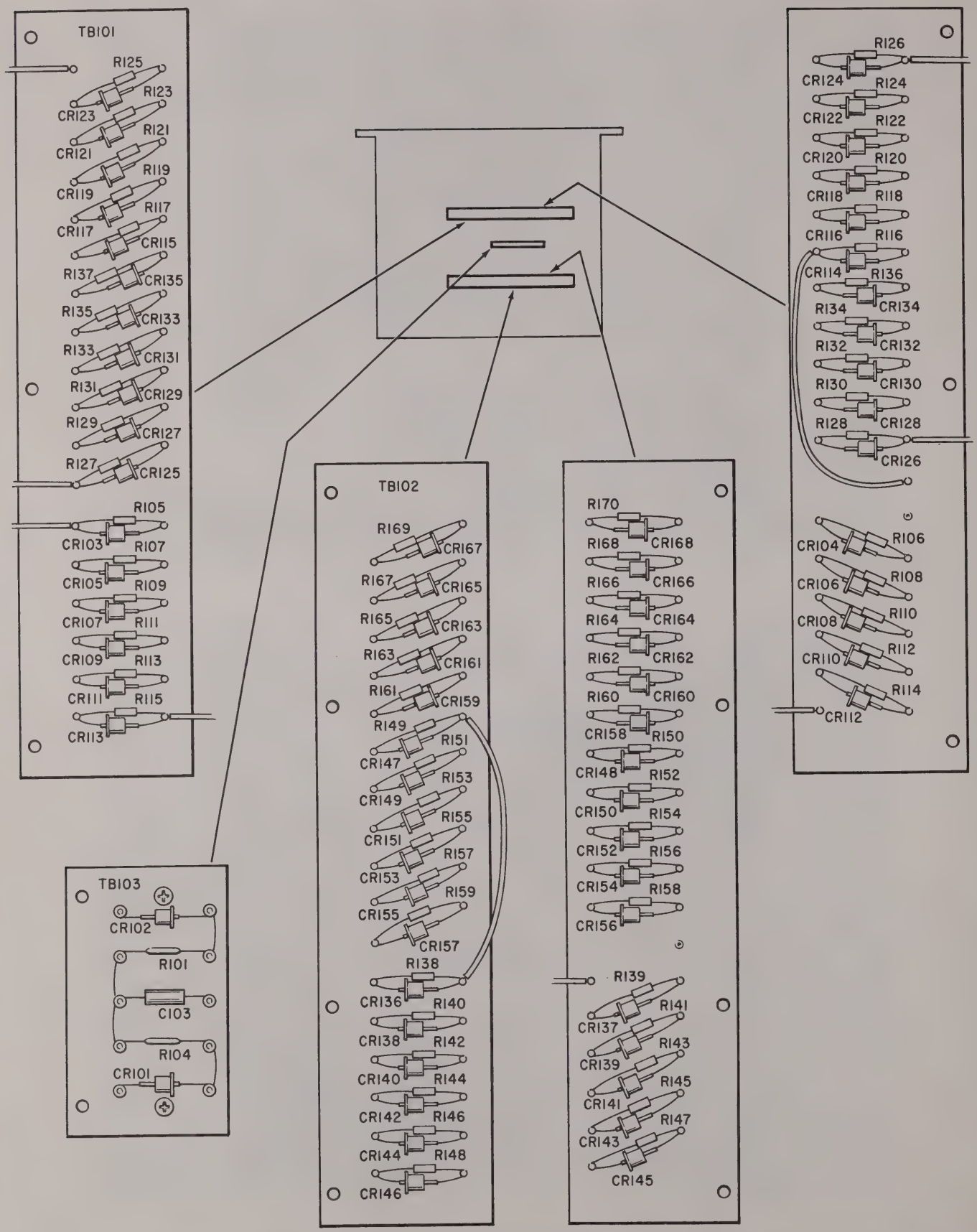



Figure 5-5. Power Supply Chassis
Terminal Board Components

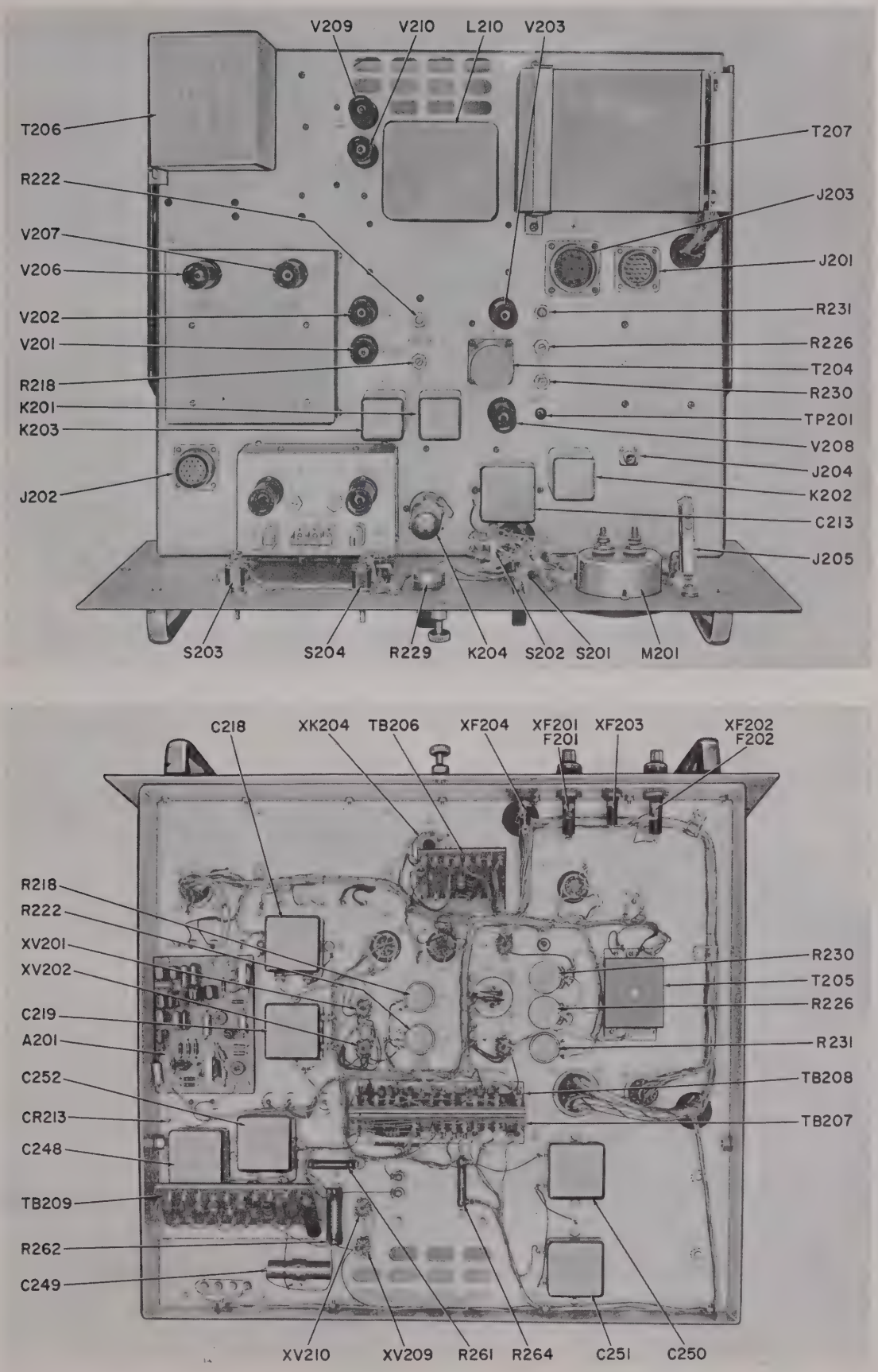
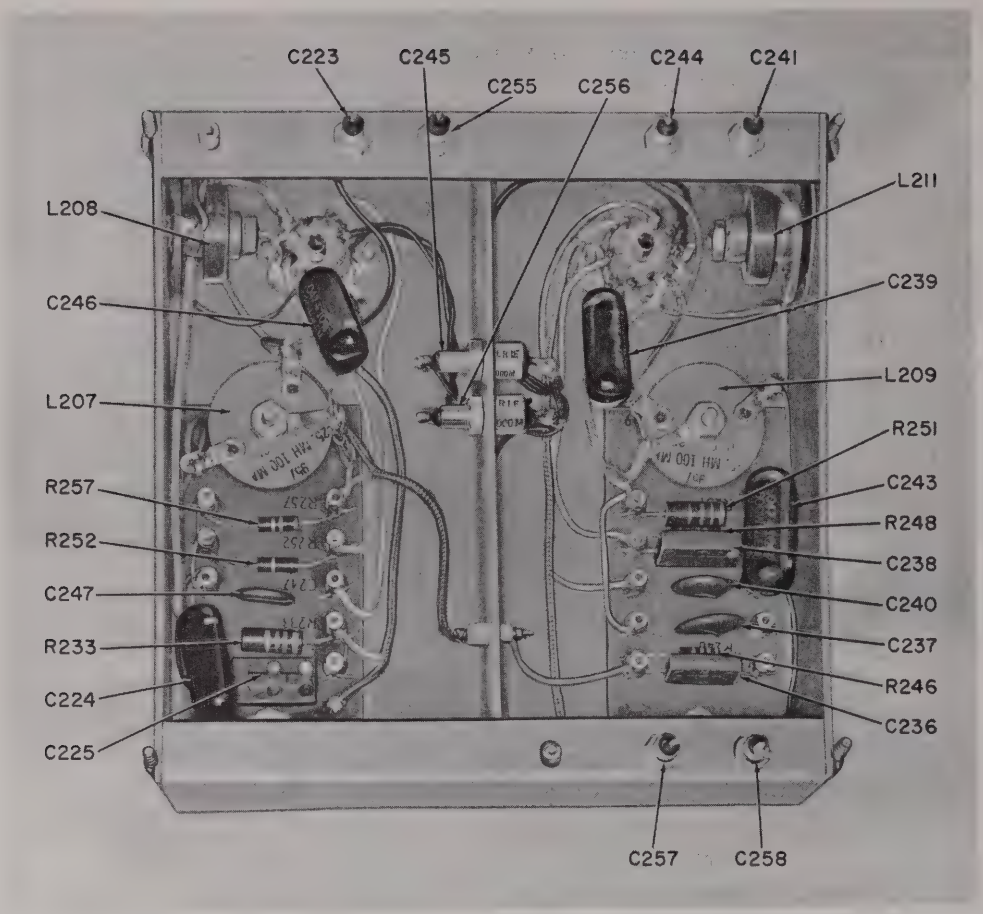



Figure 5-6. Amplifier Oscillator Chassis AM-3340/URT-20
Parts Location View



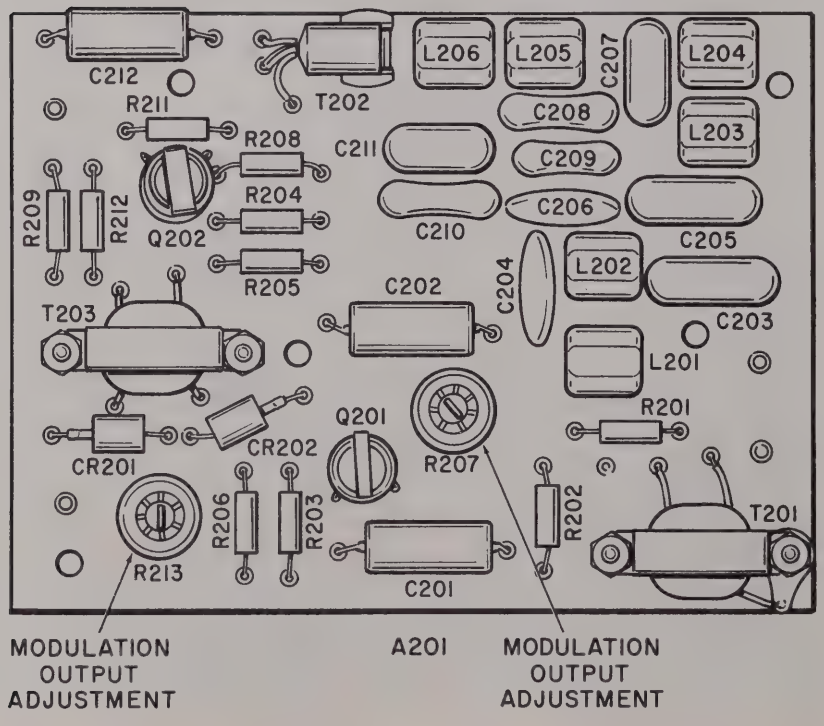
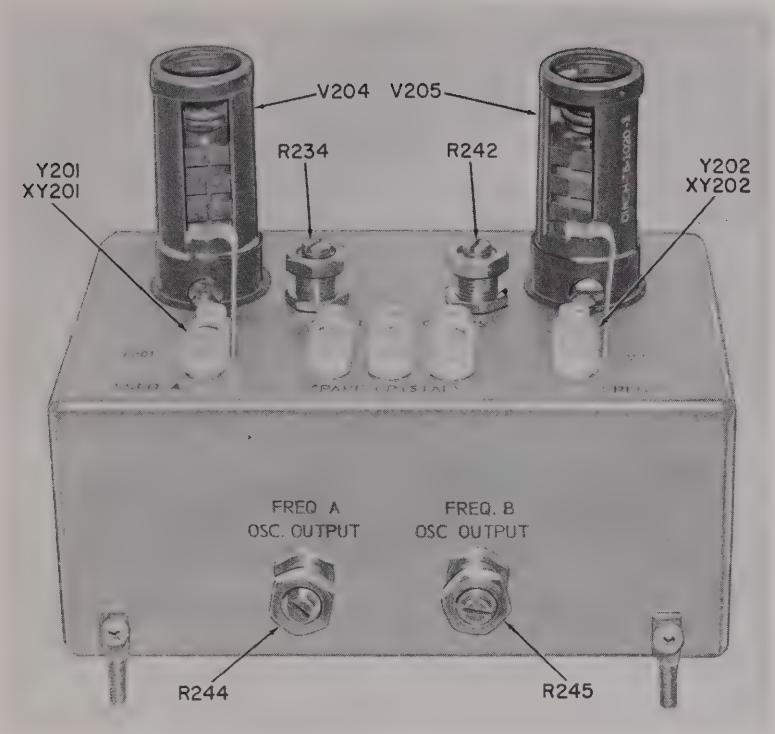
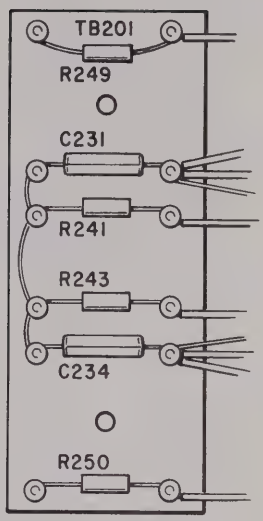
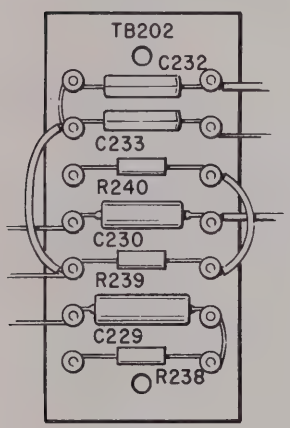
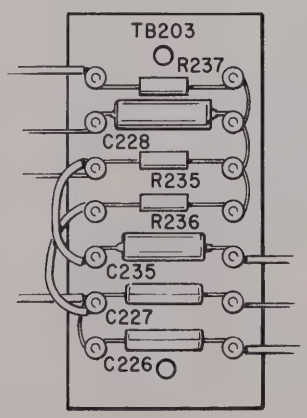




Figure 5-7. Amplifier-Oscillator Keyer Subchassis and Terminal Board A201 Parts Location Views



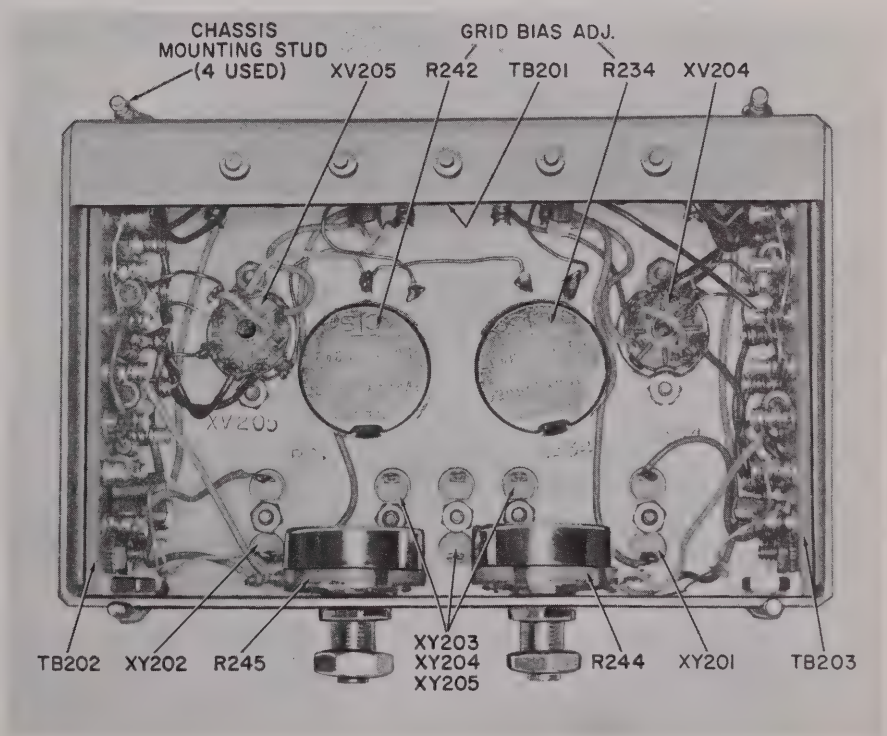




Figure 5-8. Amplifier-Oscillator, RF Oscillator Subchassis Parts Location View

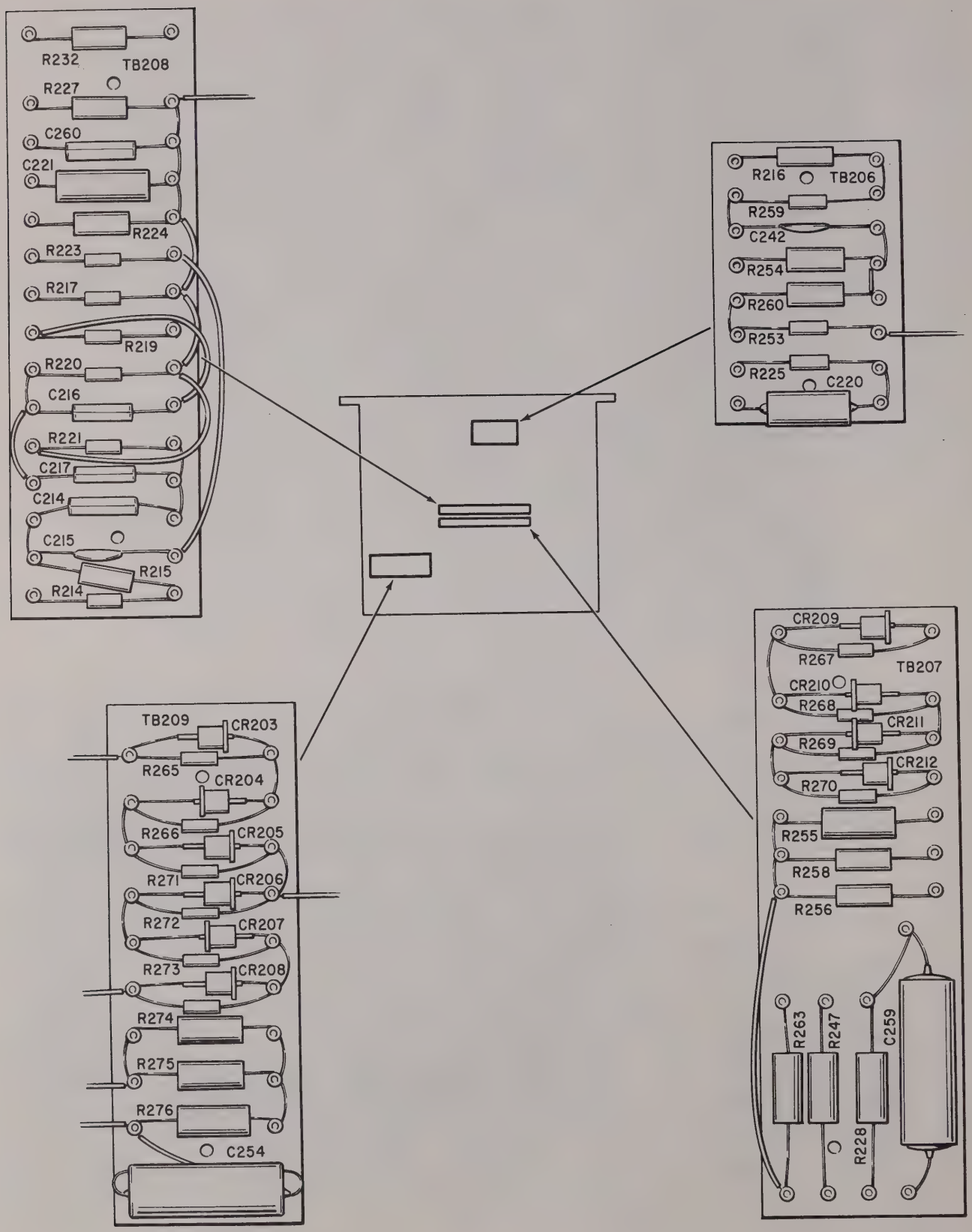



Figure 5-9. Amplifier-Oscillator Terminal Board Components

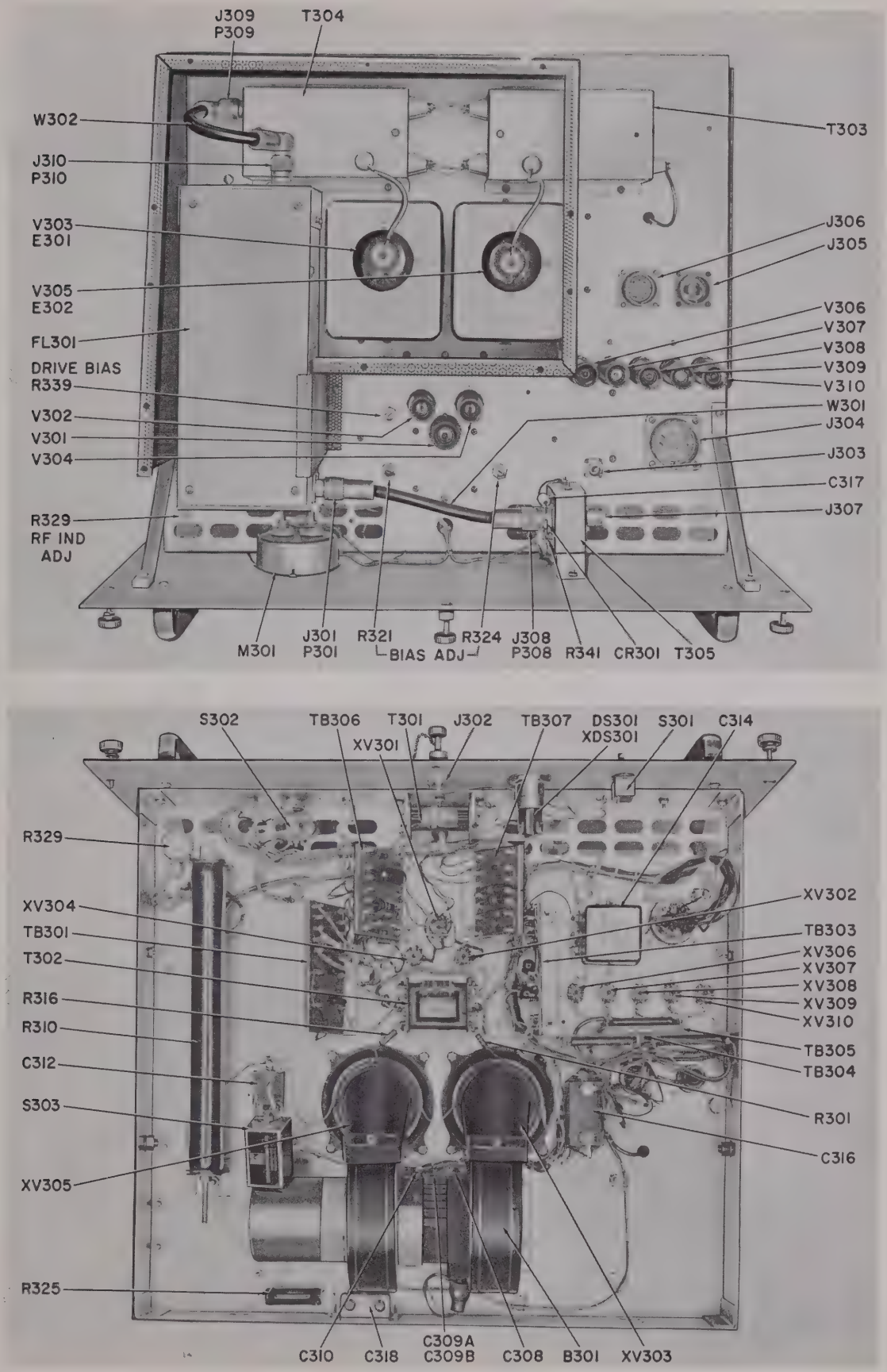



Figure 5-10. Radio Frequency Amplifier AM-3341/URT-20
Parts Location View

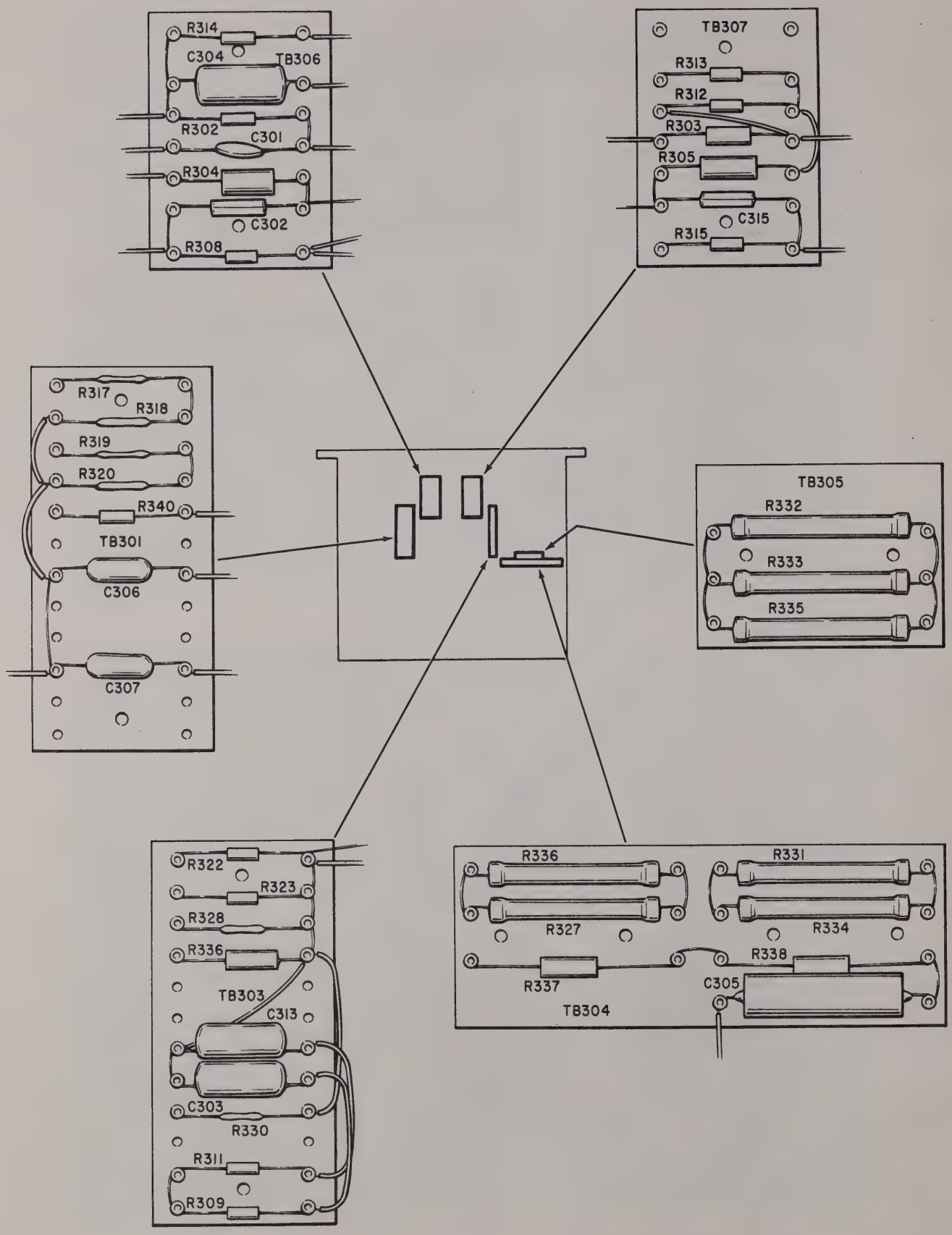



Figure 5-11. Radio Frequency Amplifier Terminal Board Components

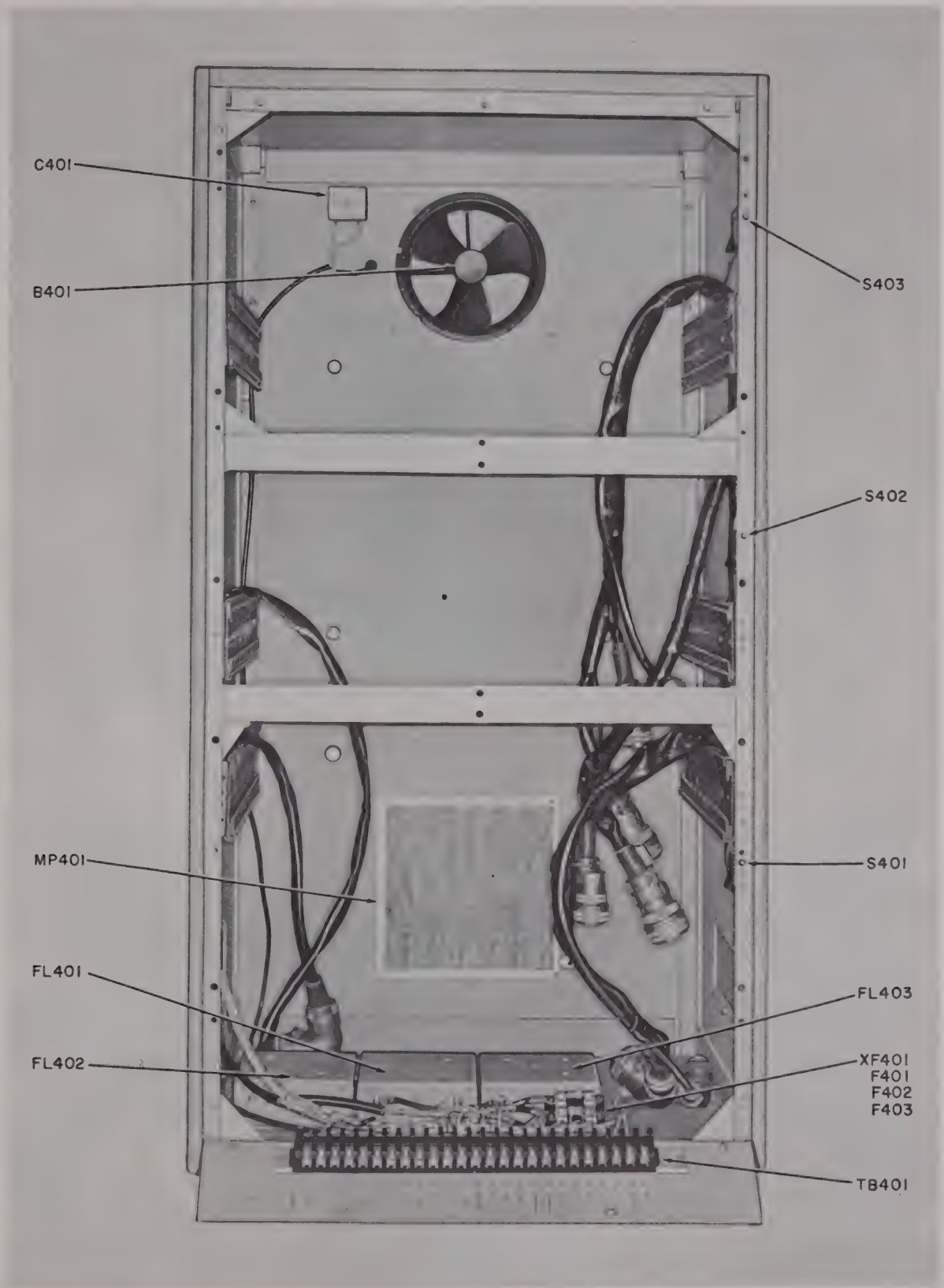



Figure 5-12. Electrical Equipment Cabinet CY-3623/URT-20
Parts Location View

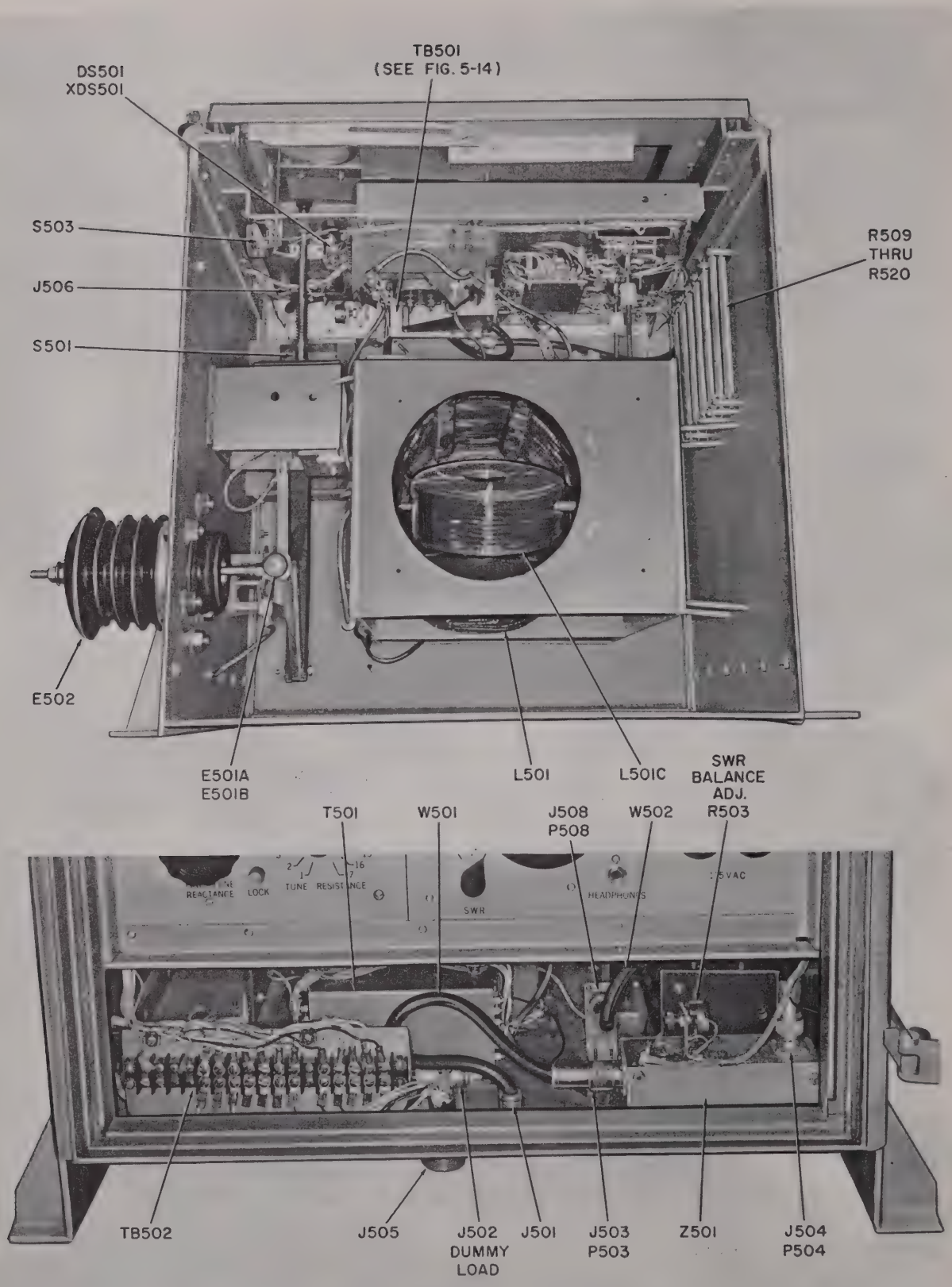
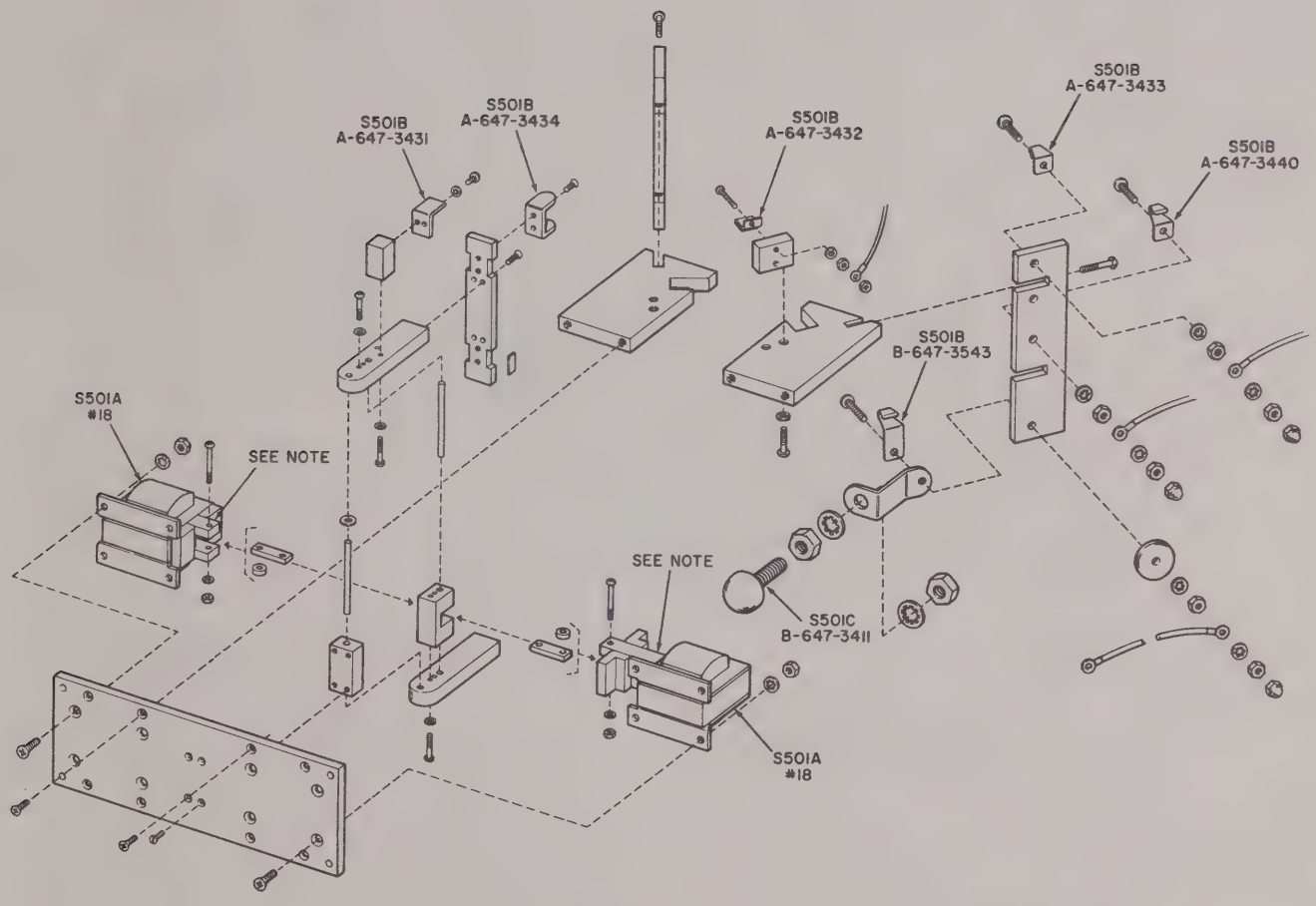



Figure 5-13. Antenna Coupler CU-1064/URT-20
Parts Location View




NOTE

The use of a silicone grease, Dow Corning #7 or equivalent, is recommended for lubrication of the solenoid cores of S501.

Figure 5-13a. RF Channel Switch S501, Exploded View

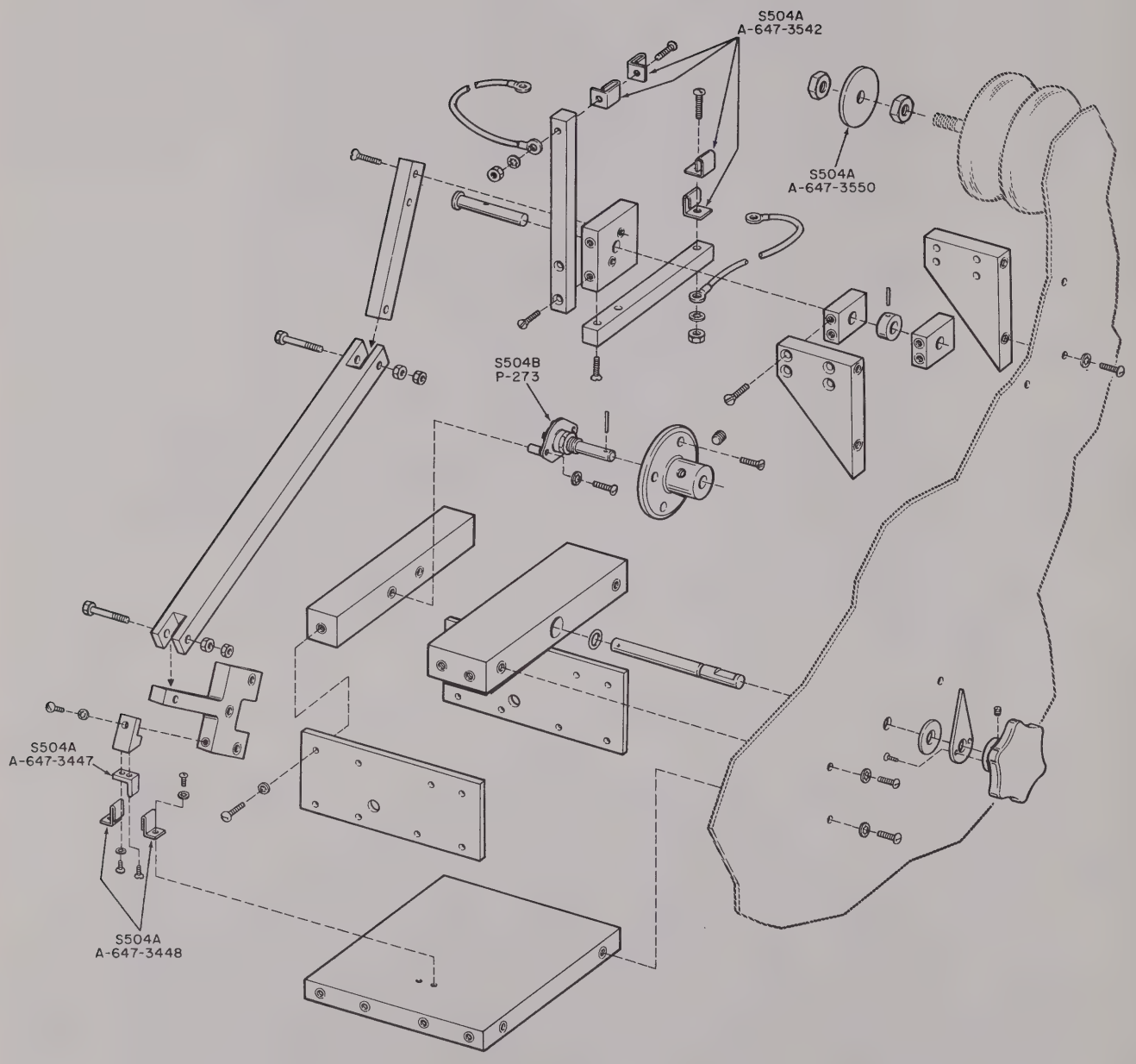



Figure 5-13b. Antenna Disconnect Switch S504, Exploded View

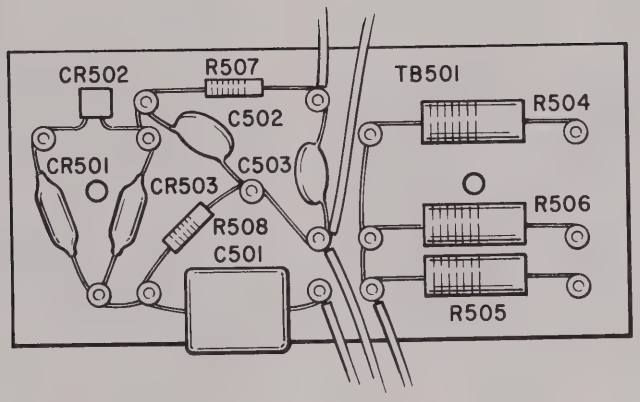



Figure 5-14. TB501 Antenna Coupler Terminal Board

# SECTION 6

# SERVICE AND REPAIR

## 6-1. FAILURE REPORT.

Submission of electronics failure reports shall be made in accordance with current instructions contained in USCG Electronics Maintenance Manual CG-165, and on the prescribed form indicated therein. The importance of providing complete information cannot be overemphasized. Do not substitute brevity for clarity.

## 6-2. PREVENTIVE MAINTENANCE.

a. Preventive maintenance is work performed on the equipment, usually when the equipment is not in use, for the purpose of maintaining the equipment in peak operating condition so that breakdowns and unnecessary interruptions of service do not occur. In addition, periodic inspection and maintenance will indicate conditions of impending equipment breakdown. When this occurs, steps should be taken to prevent complete equipment failure. Table 6-1 should be used as a guide when performing preventive maintenance.

b. Refer to current District and Headquarters directives for establishing and performing preventative maintenance procedures.

## 6-3. PERFORMANCE STANDARDS.

Table 5-2 provides a test sequence which if satisfactory from step 1 through to the end indicates the transmitter is operating satisfactorily. Table 6-2 provides data to permit maintenance personnel to adjust the various voltages within the transmitter after repairs have been made. By using the data of Table 6-2 to establish the correct operating levels then using the data of Table 5-2, a complete check of the transmitter and coupler is possible.

## 6-4. TUNING AND ADJUSTMENTS.

a. GENERAL. — Certain adjustments are necessary on the transmitter when frequency changes are made. These adjustments may not be within the scope of the operator's capabilities and are therefore included for maintenance personnel.

b. POWER AMPLIFIER GRID BIAS. — It is imperative for linear operation of the power amplifiers to maintain a cathode current that is equal on tubes V303 and V305. To adjust proceed as follows:

(1) Connect P501 to J502 at the coupler to connect the dummy load.

(2) Start the transmitter with RF DRIVE CONTROL full CCW.

TABLE 6-1. PERIODIC INSPECTION DATA

| INSPECTION | WHEN | HOW |
|---|---|---|
| All meter readings | Daily | Refer to Table 3-1. |
| External connections for abnormal conditions | Weekly | Visually. Keep connects tight and clean. |
| Dust filters | Monthly | Wash in soap solution, rinse and dry. |
| Fan operation | Monthly | Inspect for cleanliness, abnormal noises or vibration. |
| Controls, switches and meters | Daily | Check operation during use. |
| All internal parts for evidence of overheating, breakdown, leakage and the like. | Monthly | Visually. |
| Dust, dirt, and corrosion | Monthly | During visual inspection, clean off all foreign matter as necessary. |
| Antenna Switch (S504) | Monthly | Clean contacts. |

(3) Use the METER SEL SWITCH to monitor the two cathode currents on meter M301.

(4) Rotate RF DRIVE CONTROL CW until slight increase in current is apparent.

(5) If currents are not equal pull out radio frequency amplifier chassis (top chassis on transmitter) and pull out interlock switch arm.

WARNING

When interlock switch arm is pulled out the high B+ voltage (3000V) circuits are energized. Use extreme care when performing this adjustment.

(6) Adjust R321 and R324 as necessary to achieve equal cathode currents for V303 and V305.

(7) Reinstall power amplifier chassis.

c. OSCILLATOR GAIN CONTROL. — The following adjustment must be performed each time a crystal oscillator of a new frequency is installed.

(1) Stop the transmitter and connect the dummy load at the antenna coupler.

(2) Connect an RF voltmeter across the dummy load. Set voltmeter on 300 volt range.

(3) Start the transmitter.

WARNING

Do not touch voltmeter or dummy load terminals while transmitter is operating.

(4) Turn RF DRIVE CONTROL to full CW position (maximum drive). If voltage across dummy load exceeds 189 volts back off on RF DRIVE until voltage is about 180.

(5) If FREQ A oscillator was changed adjust R244 to reduce the voltage across the dummy load. Rotate RF DRIVE clockwise until 189 volts is indicated on meter across dummy load.

(6) Adjust R244 and the RF DRIVE until 189 volts is across the dummy load when RF DRIVE is full clockwise.

CAUTION

Do not exceed 189 volts across dummy load for extended periods or power amplifiers may be damaged.

6-5. REMOVAL, REPAIR AND REPLACEMENT.

a. GENERAL. — Do not attempt removal of parts when equipment is energized. In most cases removal

TABLE 6-2. PERFORMANCE STANDARDS DATA

NOTE: Use this data in conjunction with Table 5-2 when parts replacement or malfunction occur. See schematic diagram Figures 6-1 and 6-2.

| TEST POINT | VARIABLE RESISTOR | FUNCTION | ADJUST FOR INDICATION OF |
|---|---|---|---|
| A | R207 | Mod Output Resistor | Linear audio at R213 |
| B | R213 | Mod Output Resistor | 70% modulation at R229 |
| C | R218 | Freq Control | Adjust for 800 cycles at TB201 |
| D | R222 | Audio Oscillator Control | 70% modulation at R229 |
| E | R226 | V203 RF Input | Linear RF at R229 |
| F | R229 | V203 Mixer Output | RF DRIVE CONTROL, adjust as necessary |
| G | R230 | V203 Mixer Bias | Adjust for -4 volts bias |
| H | R231 | Bias Limiting | Peak mod RF equal to peak unmod RF at R229 |
| I | R234 | V204 Freq. Control | Adjust both for desired frequency. Adjusting full CW may stop oscillators. |
| J | R242 | V205 Freq. Control | |
| K | R244 | V204 RF Output | Adjust for 189 volts at dummy load with R229 full CW |
| L | R245 | V205 RF Output | |
| M | R321 | V303 Bias | Equal cathode currents on V303 and V305 |
| P | R324 | V305 Bias | |
| Q | R329 | RF Amp Calibration | Adjust for 2 amp meter indication when transmitter delivers 208 watts into 52 ohm dummy load. (Voltage across load is 104 volts.) |
| R | R339 | Drive Bias Adj. | -8 volt at V302 and V304 grids |
| S | R503 | SWR BALANCE ADJ | With SWR coupler terminated in 52 ohm and with S509 in INDICATE position and SWR CAL, R503 in fullscale position, adjust until M502 reads MIN. |

involves unsoldering leads, disconnecting terminals and removal of fastening devices or shields. When resoldering always use the minimum amount of solder necessary to affect a solid connection. Remove excess solder. Route leadwires in same path from which removed. Use figures 6-1 through 6-3 when transformers are being repaired.

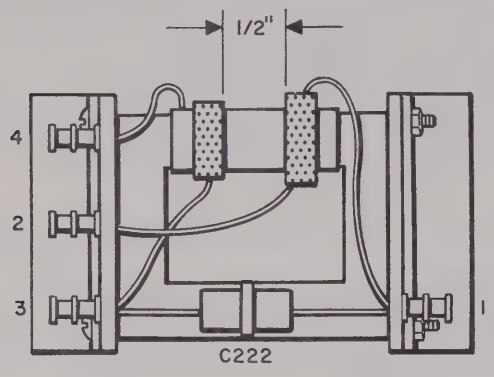
b. CHASSIS REMOVAL. — Remove captive screws from front of transmitter. Pull drawer out until able to disconnect cable connectors. Two men, one on each side, can then lift out the drawer. Replace in reverse order.

CAUTION

The bottom access door on the transmitter must be open before the Power Supply Chassis PP-3385/URT-20 can be removed.

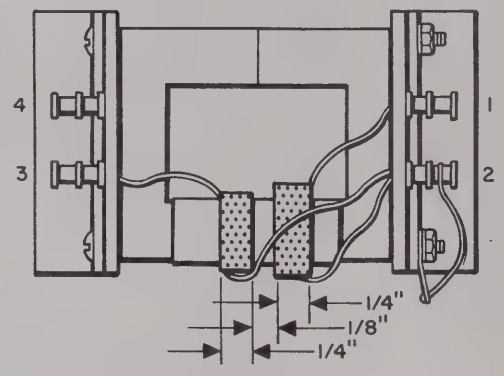
## 6-6. OVERALL SCHEMATIC DIAGRAMS.

Figures 6-4 and 6-5 are the overall schematic diagrams of the transmitter and antenna coupler. Interconnection diagram (figure 2-6) shows chassis to chassis cable connections.



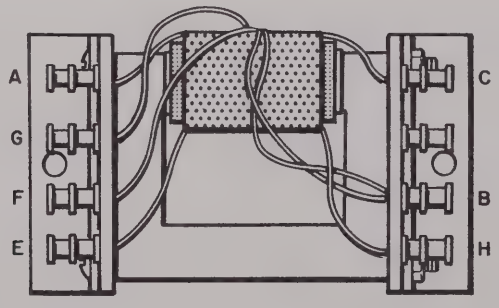

Wind primary with 225 turns
Wind secondary with 15 turns
Use 7-44 Litz wire
Apply varnish to coils after soldering
Secure capacitor (C222) to coil form with lacing cord

Figure 6-1. Winding Data for Transformer T205




Wind primary with 25 turns
Wind secondary with 150 turns
Use 7-44 Litz wire
Varnish coil after soldering

Figure 6-2. Winding Data for Transformer T301




USE 33HNC NYCLAD WIRE

Primary

Start at E ; wind 50 turns clockwise to center of coil form F
Start at center of coil form G ; wind 50 turns clockwise to H
Cover primary with one layer 0.002 Mylar tape 3/4 inch wide

Secondary

Start A ; wind 45 turns clockwise to center of coil form B
Bring out loop for center tap; continue with 45 turns from center of form to C
Cover secondary with one layer 0.002 Mylar tape 3/4 inch wide

Apply Varnish after Soldering

Figure 6-3. Winding Data for Transformer T302

| REF DESIG | LOCAT |
|---|---|
| C101 | 4J |
| C102 | 4I |
| C103 | 11I |
| CB101 | 11G |
| CR101 | 11I |
| CR102 | 11I |
| CR103 thru CR168 | 3L |
| DS101 | 10H |
| DS102 | 4H |
| F101 | 12H |
| J101 | 4G |
| J102 | 14I |
| J103 | 4L |
| K101 | 9H |
| K102 | 6H |
| K103 | 5H |
| K104 | 9I |
| L101 | 4I |
| P101 | 4G |
| R101 | 11H |
| R102 | 9H |
| R103 | 7I |
| R104 thru R170 | 12I |
| R105 thru R172 | 3L |
| S101 | 10J |
| S102 | 6I |
| S103 | 8H |
| T101 | 10H |
| T102 | 2H |
| T103 | 1H |
| T104 | 1H |
| TD101 | 7I |
| C201 | 8C |
| C202 | 9C |
| C203 | 10B |
| C204 | 9C |
| C205 | 10B |
| C206 | 10C |
| C207 | 10B |
| C208 | 11C |
| C209 | 11B |
| C210 | 11C |
| C211 | 11B |
| C212 | 12C |
| C213 | 17B |
| C214 | 17B |
| C215 | 17B |
| C216 | 17C |
| C217 | 18C |
| C218 | 16C |
| C219 | 16C |
| C220 | 20B |
| C221 | 21D |
| C222 | 22D |
| C223 | 20D |
| C224 | 19D |
| C225 | 19D |
| C226 | 17B |
| C227 | 17B |
| C228 | 17B |
| C229 | 18B |
| C230 | 18B |

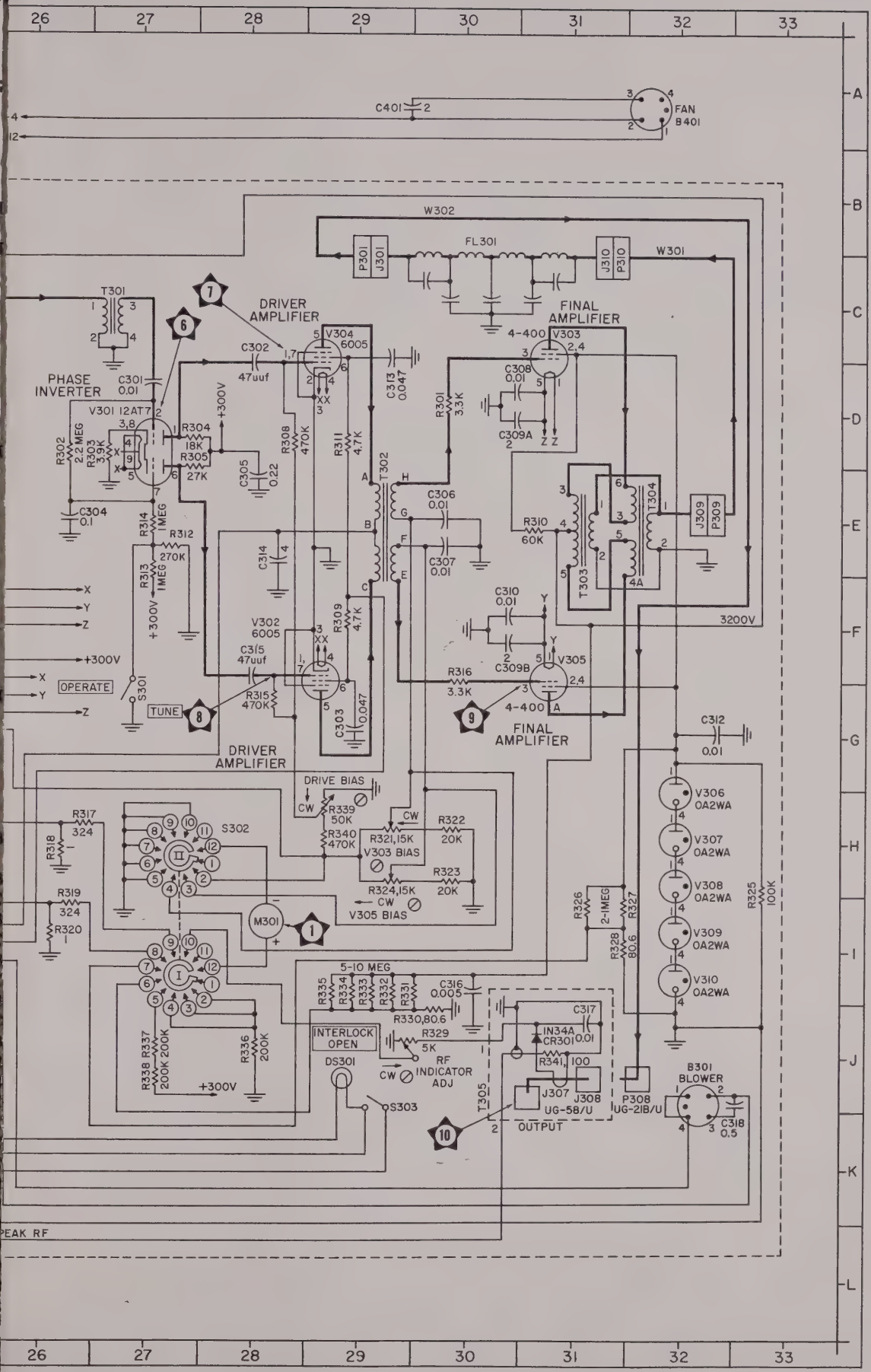



Figure 6-4. Radio Transmitting Set AN/URT-20 Schematic Diagram

involves unsoldering leads, disconnecting terminals and removal of fastening devices or shields. When resoldering always use the minimum amount of solder necessary to affect a solid connection. Remove excess solder. Route leadwires in same path from which removed. Use figures 6-1 through 6-3 when transformers are being repaired.

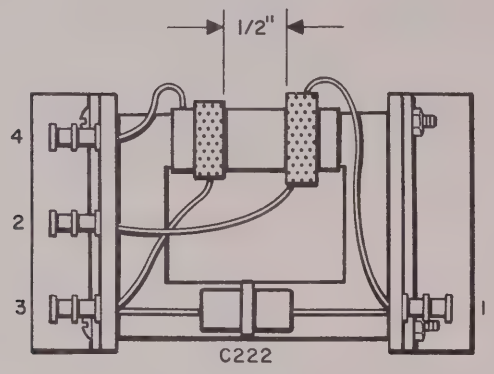
b. CHASSIS REMOVAL. — Remove captive screws from front of transmitter. Pull drawer out until able to disconnect cable connectors. Two men, one on each side, can then lift out the drawer. Replace in reverse order.

CAUTION

The bottom access door on the transmitter must be open before the Power Supply Chassis PP-3385/URT-20 can be removed.

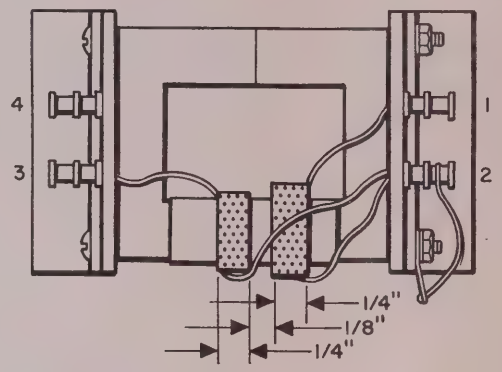
6-6. OVERALL SCHEMATIC DIAGRAMS.

Figures 6-4 and 6-5 are the overall schematic diagrams of the transmitter and antenna coupler. Interconnection diagram (figure 2-6) shows chassis to chassis cable connections.



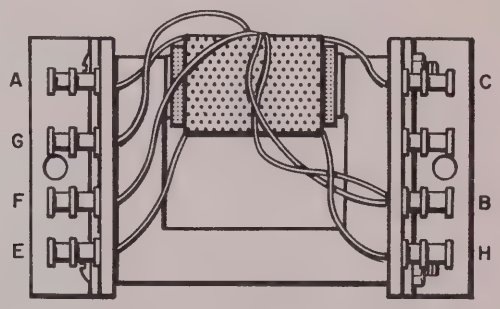

Wind primary with 225 turns
Wind secondary with 15 turns
Use 7-44 Litz wire
Apply varnish to coils after soldering
Secure capacitor (C222) to coil form with lacing cord

Figure 6-1. Winding Data for Transformer T205




Wind primary with 25 turns
Wind secondary with 150 turns
Use 7-44 Litz wire
Varnish coil after soldering

Figure 6-2. Winding Data for Transformer T301




USE 33HNC NYCLAD WIRE

Primary

Start at E ; wind 50 turns clockwise to center of coil form F
Start at center of coil form G ; wind 50 turns clockwise to H
Cover primary with one layer 0.002 Mylar tape 3/4 inch wide

Secondary

Start A ; wind 45 turns clockwise to center of coil form B
Bring out loop for center tap; continue with 45 turns from center of form to C
Cover secondary with one layer 0.002 Mylar tape 3/4 inch wide

Apply Varnish after Soldering

Figure 6-3. Winding Data for Transformer T302

| REF DESIG | LOCATION | REF DESIG | LOCATION | REF DESIG | LOCATION | REF DESIG | LOCATION | REF DESIG | LOCATION |
|---|---|---|---|---|---|---|---|---|---|
| C101 | 4J | C231 | 17G | R205 | 9B | R273 | 19J | R307 | Not used |
| C102 | 4I | C232 | 17F | R206 | 9C | R274 | 19K | R308 | 28D |
| C103 | 11I | C233 | 18F | R207 | 9C | R275 | 7B | R309 | 29F |
| CB101 | 11G | C234 | 18G | R208 | 9A | R276 | 7B | R310 | 31E |
| CR101 | 11I | C235 | 17G | R209 | 12A | S201 | 16H | R311 | 29D |
| CR102 | 11I | C236 | 19F | R210 | Not used | S202 | 17H | R312 | 27E |
| CR103 | 3L | C237 | 20F | R211 | 13C | S203 | 16I | R313 | 27F |
| thru | | C238 | 20G | R212 | 12B | S204 | 16H | R314 | 27E |
| CR168 | 3L | C239 | 21G | R213 | 14B | T201 | 7C | R315 | 28G |
| DS101 | 10H | C240 | 20F | R214 | 16B | T202 | 12C | R316 | 30F |
| DS102 | 4H | C241 | 21F | R215 | 16B | T203 | 13B | R317 | 26H |
| F101 | 12H | C242 | 23G | R216 | 18A | T204 | 20C | R318 | 26H |
| J101 | 4G | C243 | 21F | R217 | 16C | T205 | 22C | R319 | 26I |
| J102 | 14I | C244 | 22E | R218 | 17C | T206 | 19L | R320 | 26I |
| J103 | 4L | C245 | 22E | R219 | 17C | T207 | 21K | R321 | 29H |
| K101 | 9H | C246 | 21E | R220 | 18C | V201 | 16B | R322 | 30H |
| K102 | 6H | C247 | 20E | R221 | 18C | V202 | 19B | R323 | 30H |
| K103 | 5H | C248 | 18I | R222 | 18C | V203 | 21C | R324 | 29I |
| K104 | 9I | C249 | 20I | R223 | 18B | V204 | 17F | R325 | 33H |
| L101 | 4I | C250 | 22I | R224 | 19C | V205 | 18F | R326 | 31I |
| P101 | 4G | C251 | 22I | R225 | 20B | V206 | 20G | R327 | 31I |
| R101 | 11H | C252 | 17J | R226 | 21D | V207 | 20E | R328 | 31I |
| R102 | 9H | C253 | 21I | R227 | 20C | V208 | 23E | R329 | 30J |
| R103 | 7I | C254 | 8A | R228 | 20B | V209 | 20I | R330 | 30J |
| R104 | 12I | C255 | 20H | R229 | 22C | V210 | 20J | R331 | 29I |
| R105 | 3L | C256 | 20G | R230 | 21D | Y201 | 16F | R332 | 29I |
| thru | | C257 | 18H | R231 | 22D | Y202 | 17F | R333 | 29I |
| R170 | 3L | C258 | 18G | R232 | 22D | B301 | 32J | R334 | 29I |
| R171 | 3J | C259 | 20C | R233 | 19D | C301 | 27D | R335 | 29I |
| R172 | 5I | C260 | 21C | R234 | 16G | C302 | 28C | R336 | 28J |
| S101 | 10J | CR201 | 13B | R235 | 16E | C303 | 29G | R337 | 27J |
| S102 | 6I | CR202 | 13C | R236 | 17F | C304 | 26E | R338 | 27J |
| S103 | 8H | CR203 | 18J | R237 | 17E | C305 | 28E | R339 | 29H |
| T101 | 10H | thru | | R238 | 17E | C306 | 29E | R340 | 29H |
| T102 | 2H | CR208 | 18J | R239 | 18E | C307 | 30E | R341 | 31J |
| T103 | 1H | CR209 | 21J | R240 | 18E | C308 | 30D | S301 | 27G |
| T104 | 1H | thru | | R241 | 17G | C309A | 30D | S302 | 28H |
| TD101 | 7I | CR212 | 21J | R242 | 17G | C309B | 30F | S303 | 30J |
| C201 | 8C | CR213 | 6A | R243 | 18G | C310 | 30F | T301 | 27C |
| C202 | 9C | F201 | 20K | R244 | 18G | C311 | Not used | T302 | 29D |
| C203 | 10B | F202 | 21K | R245 | 19F | C312 | 32G | T303 | 31E |
| C204 | 9C | J201 | 14I | R246 | 20F | C313 | 29D | T304 | 32E |
| C205 | 10B | J202 | 5B, 14C | R247 | 21H | C314 | 28E | T305 | 30J |
| C206 | 10C | J203 | 25F | R248 | 20G | C315 | 28F | V301 | 26D |
| C207 | 10B | J204 | 23H | R249 | 19F | C316 | 30I | V302 | 28F |
| C208 | 11C | J205 | 16D | R250 | 19G | C317 | 31J | V303 | 31C |
| C209 | 11B | K201 | 16D | R251 | 20F | C318 | 32K | V304 | 29C |
| C210 | 11C | K202 | 22A | R252 | 20E | CR301 | 31J | V305 | 31F |
| C211 | 11B | K203 | 23B | R253 | 22E | DS301 | 29J | V306 | 32H |
| C212 | 12C | K204 | 23G | R254 | 22G | FL301 | 30B | V307 | 32H |
| C213 | 17B | K201 | 9C | R255 | 23F | J301 | 29C | V308 | 32H |
| C214 | 17B | L202 | 10C | R256 | 23E | J302 | 25L | V309 | 32I |
| C215 | 17B | L203 | 10C | R257 | 20E | J303 | 25C | V310 | 32I |
| C216 | 17C | L204 | 10B | R258 | 22F | J304 | 26E | B401 | 32A |
| C217 | 18C | L205 | 11B | R259 | 23G | J305 | 25B | C401 | 29A |
| C218 | 16C | L206 | 11B | R260 | 22G | J306 | 25I | F401 | 2D |
| C219 | 16C | L207 | 20D | R261 | 19I | J307 | 31J | F402 | 2E |
| C220 | 20B | L208 | 21E | R262 | 19I | J308 | 31J | F403 | 2E |
| C221 | 21D | L209 | 21E | R263 | 21I | J309 | 32E | FL401 | 2D |
| C222 | 22D | L210 | 19I | R264 | 21I | J310 | 31C | FL402 | 3D |
| C223 | 20D | L211 | 21G | R265 | 18K | M301 | 28I | FL403 | 4D |
| C224 | 19D | M201 | 23J | R266 | 18J | R301 | 30D | S401 | 8L |
| C225 | 19D | Q201 | 8C | R267 | 21J | R302 | 26D | S402 | 8L |
| C226 | 17E | Q202 | 13Q | R268 | 21J | R303 | 27D | S403 | 9L |
| C227 | 17F | R201 | 7C | R269 | 21J | R304 | 28D | TB401 | 6D |
| C228 | 17E | R202 | 8C | R270 | 22J | R305 | 27D | W301 | 32B |
| C229 | 18E | R203 | 8C | R271 | 18J | R306 | Not Used | W302 | 30B |
| C230 | 18F | R204 | 8B | R272 | 19J | | | | |

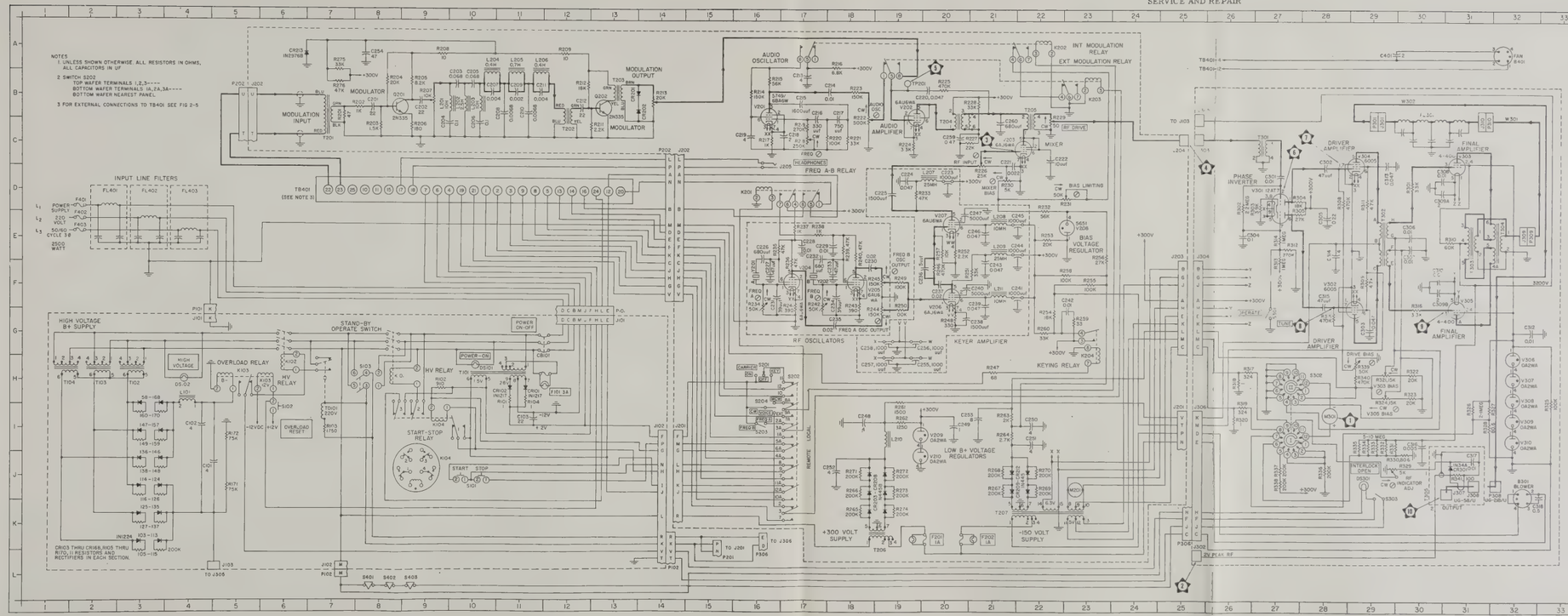
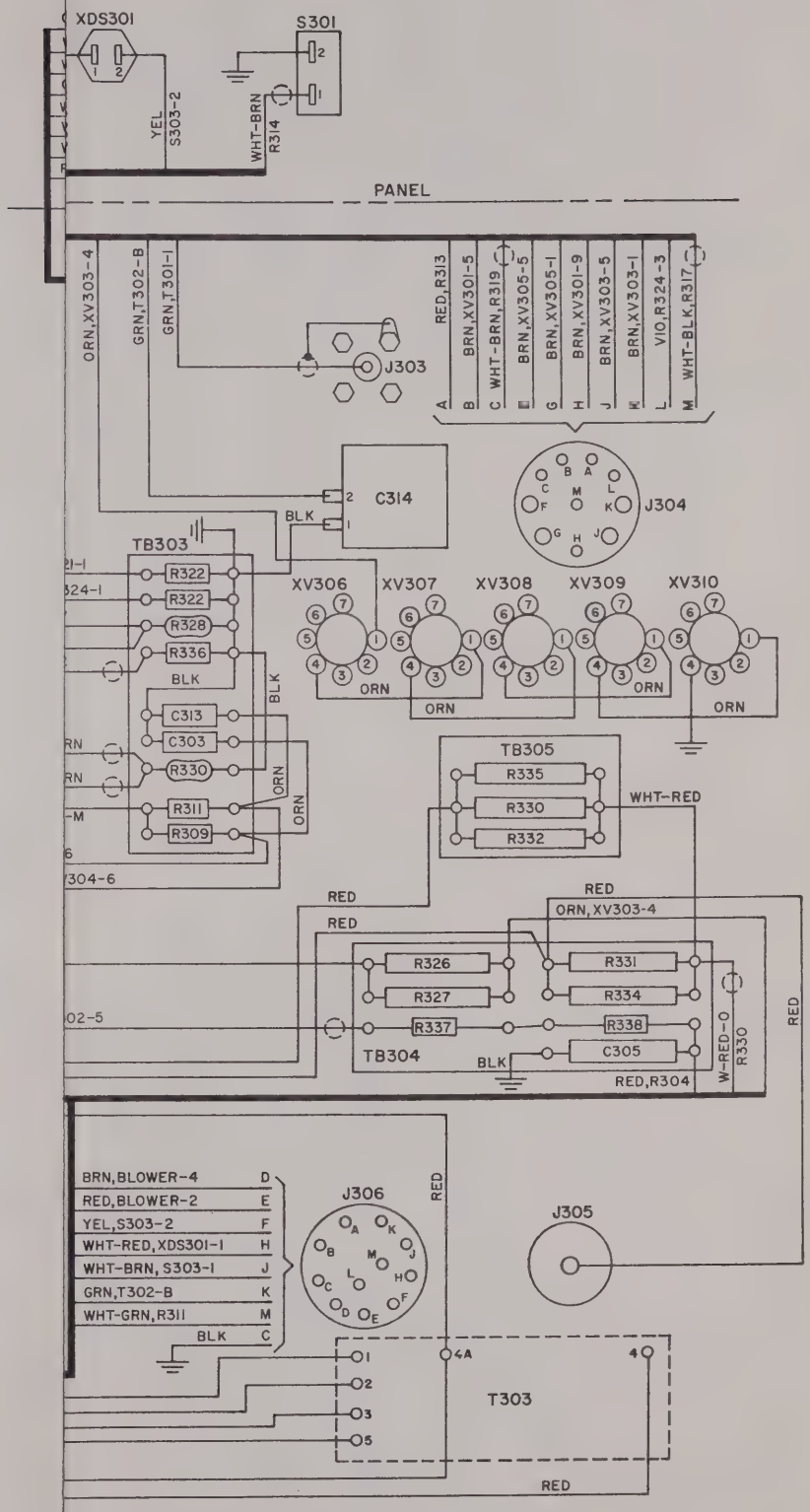



Figure 6-4. Radio Transmitting Set AN/URT-20 Schematic Diagram




Frequency AM-3341/URT-20, Wiring Diagram

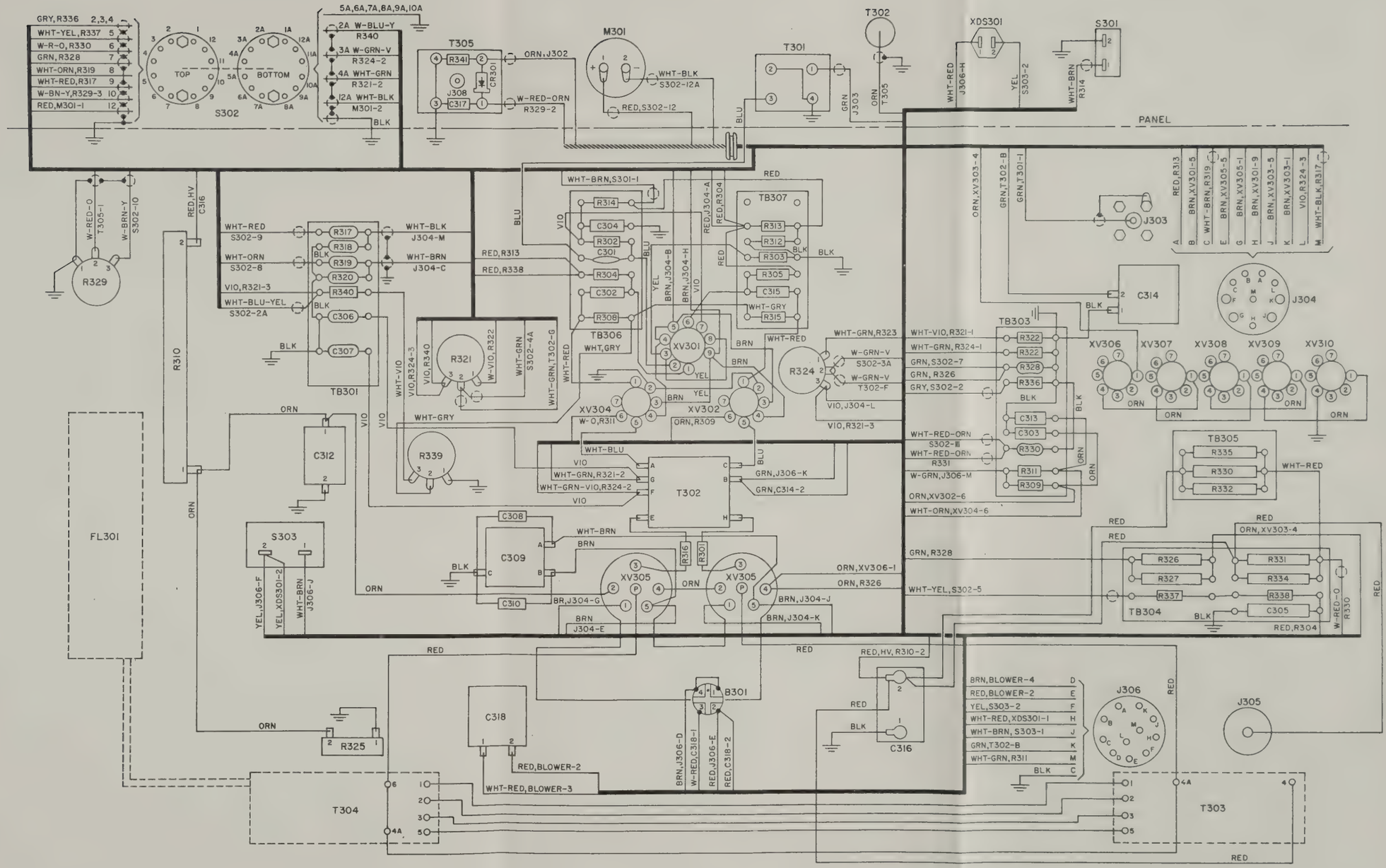
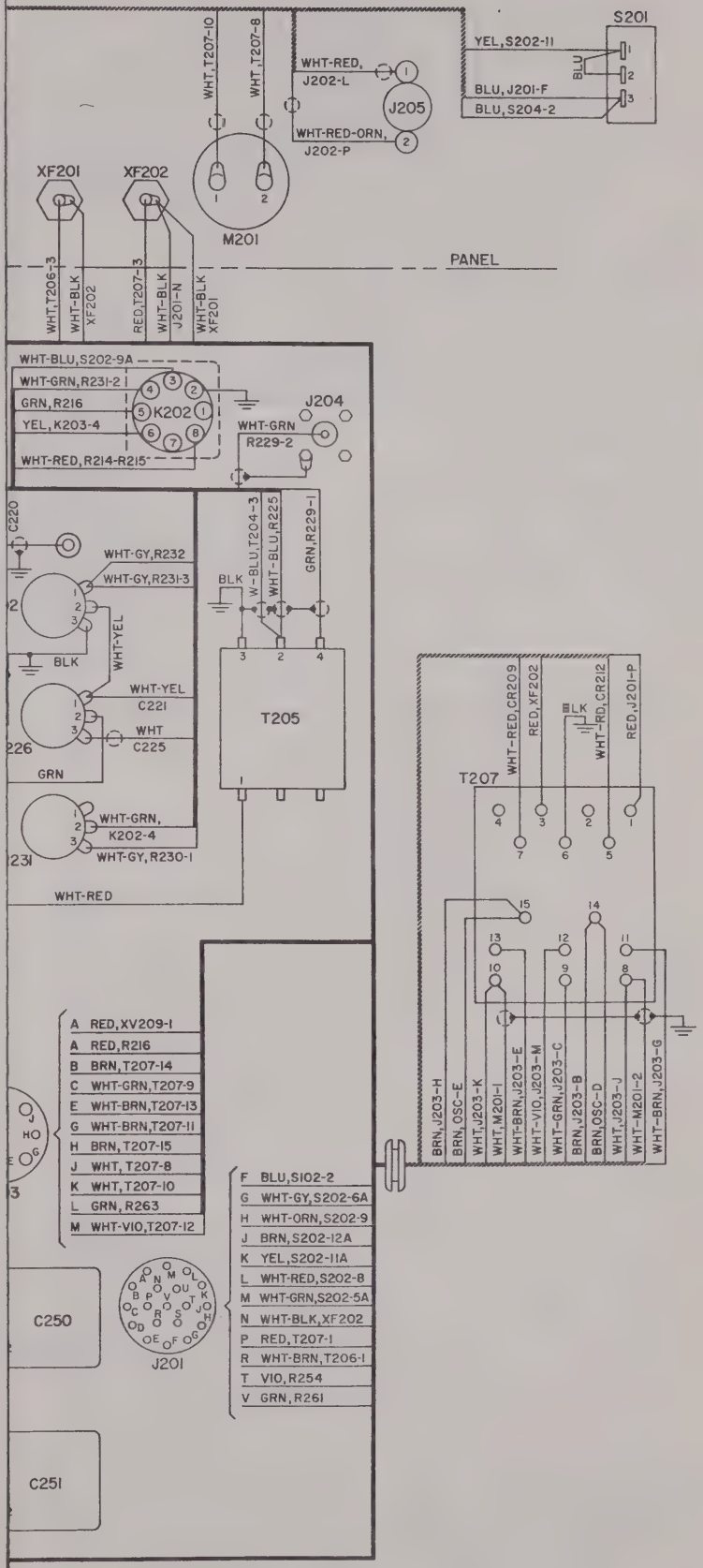
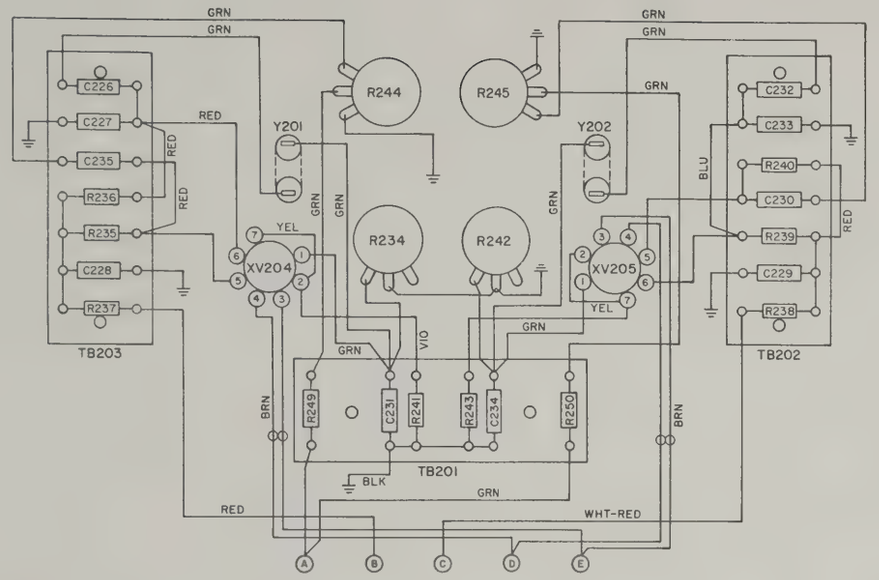


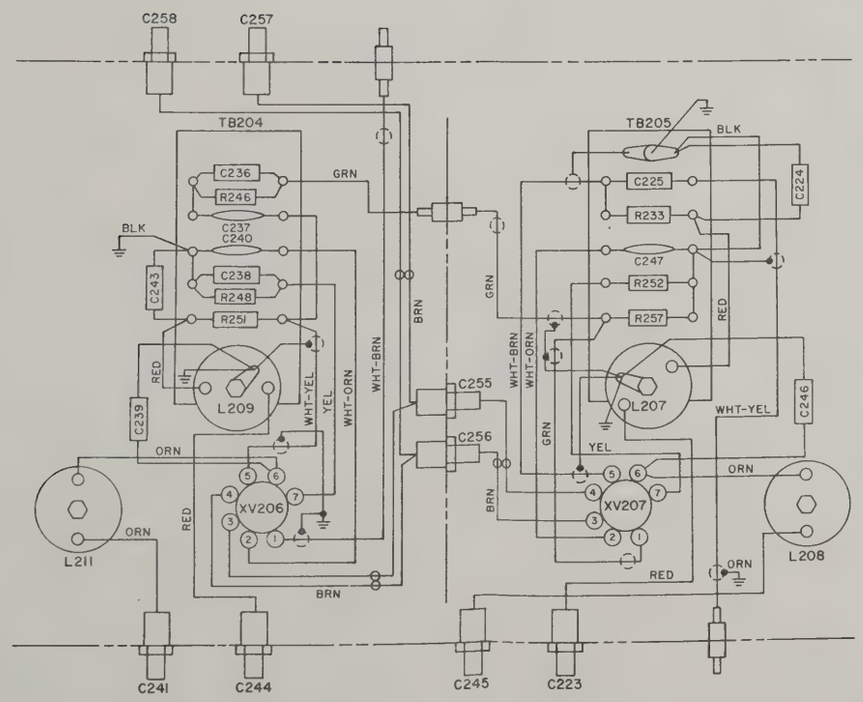

Figure 6-4a. Amplifier, Radio Frequency AM-3341/URT-20, Wiring Diagram




M-3340/URT-20, Wiring Diagram (Sheet 2 of 2)




Oscillator Chassis




Keyer Chassis

Figure 6-4b. Amplifier-Oscillator AM-3340/URT-20, Wiring Diagram (Sheet 1 of 2)

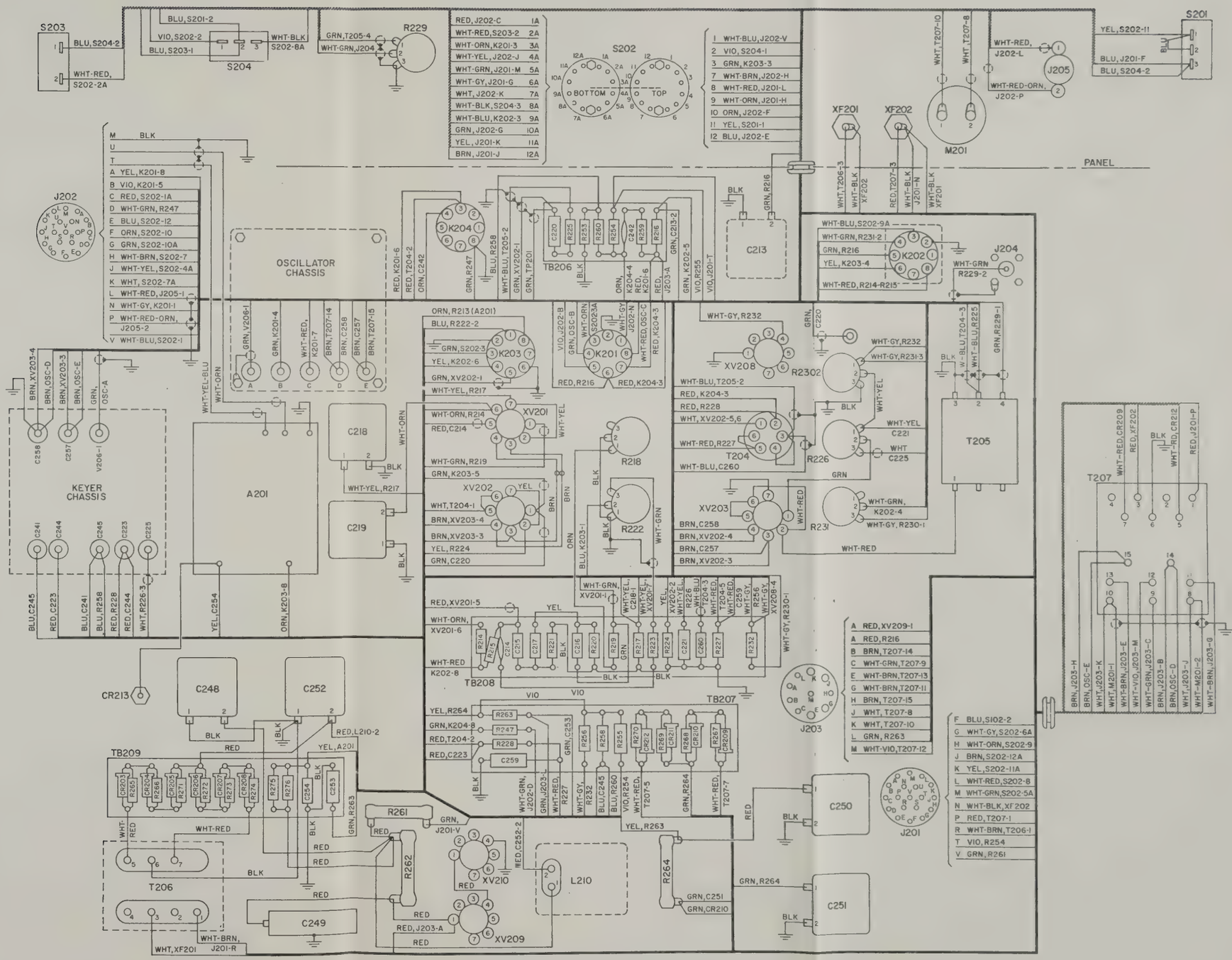
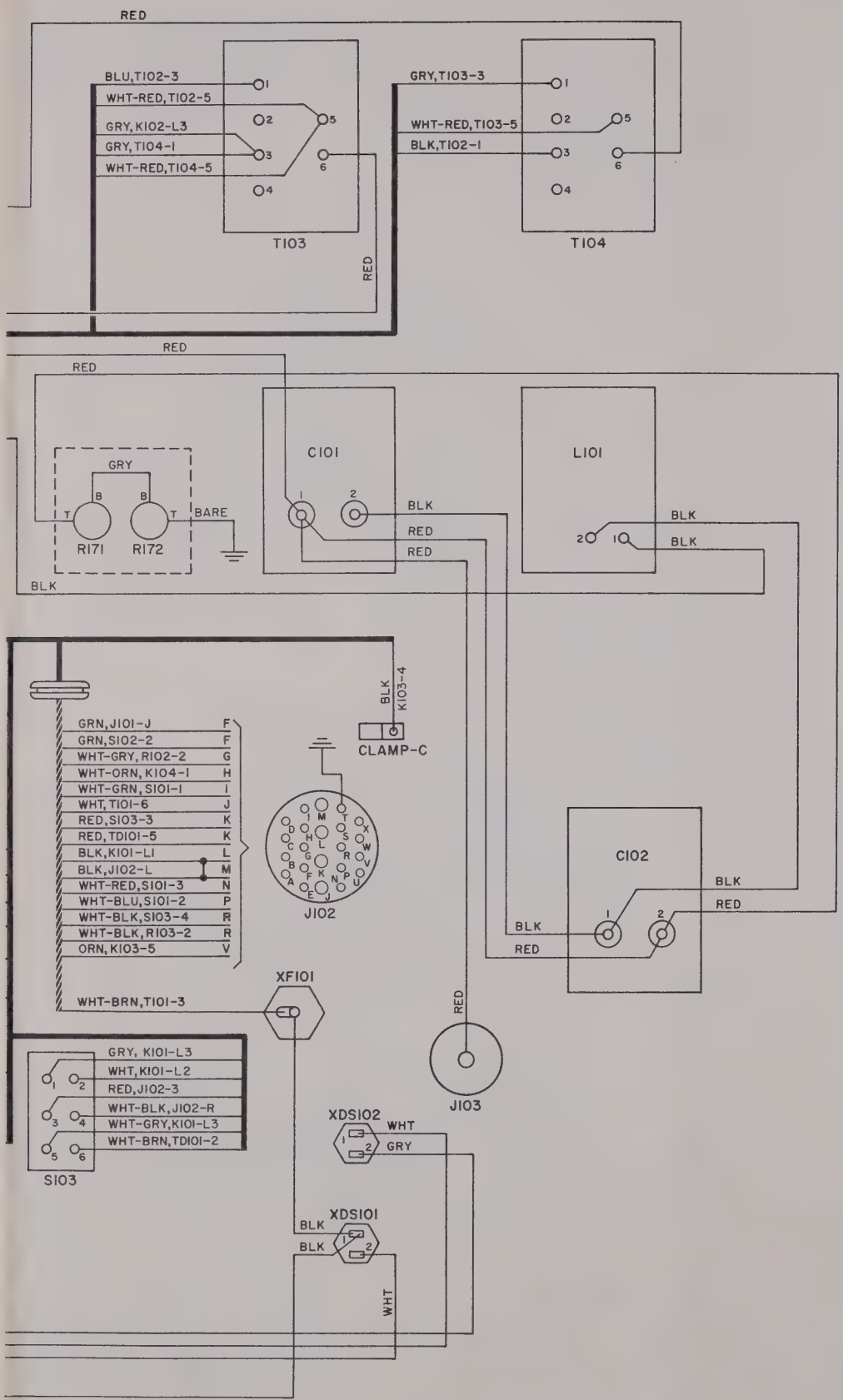
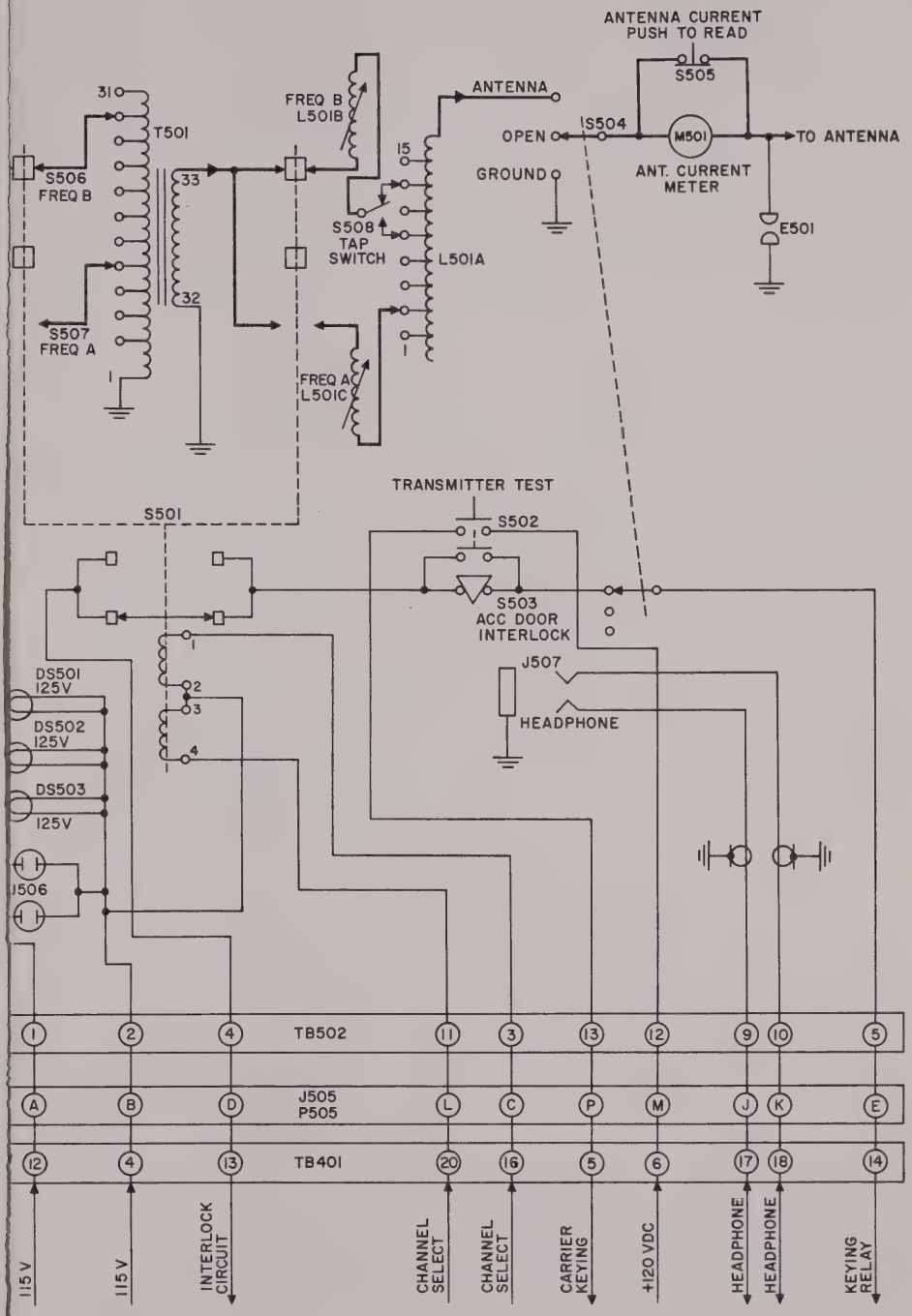



Figure 6-4b. Amplifier-Oscillator AM-3340/URT-20, Wiring Diagram (Sheet 2 of 2)


RED
BLU,T102-3
WHT-RED,T102-5
GRY,K102-L3
GRY,T104-1
WHT-RED,T104-5
T103
GRY,T103-3
WHT-RED,T103-5
BLK,T102-1
T104
RED
RED
RED
GRY
R171
R172
BARE
C101
L101
BLK
RED
RED
BLK
BLK
BLK
BLK
BLK
K103-4
CLAMP-C
GRN,J101-J
GRN,S102-2
WHT-GRY,R102-2
WHT-ORN,K104-1
WHT-GRN,S101-1
WHT,T101-6
RED,S103-3
RED,TD101-5
BLK,K101-L1
BLK,J102-L
WHT-RED,S101-3
WHT-BLU,S101-2
WHT-BLK,S103-4
WHT-BLK,R103-2
ORN,K103-5
J102
C102
BLK
RED
BLK
RED
XF101
WHT-BRN,T101-3
RED
J103
GRY,K101-L3
WHT,K101-L2
RED,J102-3
WHT-BLK,J102-R
WHT-GRY,K101-L3
WHT-BRN,TD101-2
S103
XDS102
WHT
GRY
XDS101
BLK
BLK
WHT




Antenna Coupler CU-1064/URT-20 Schematic Diagram

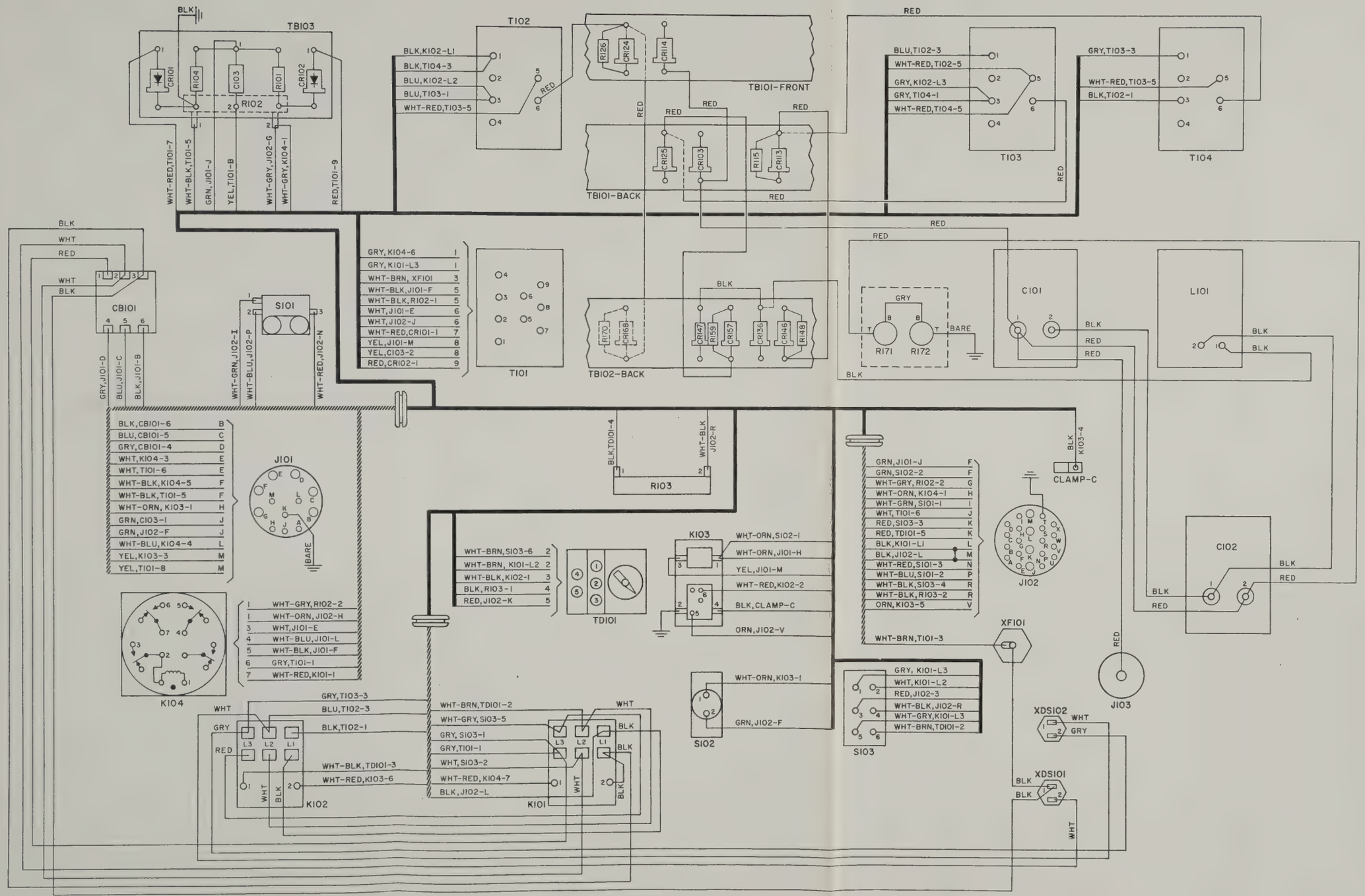



Figure 6-4c. Power Supply PP-3385/URT-20, Wiring Diagram

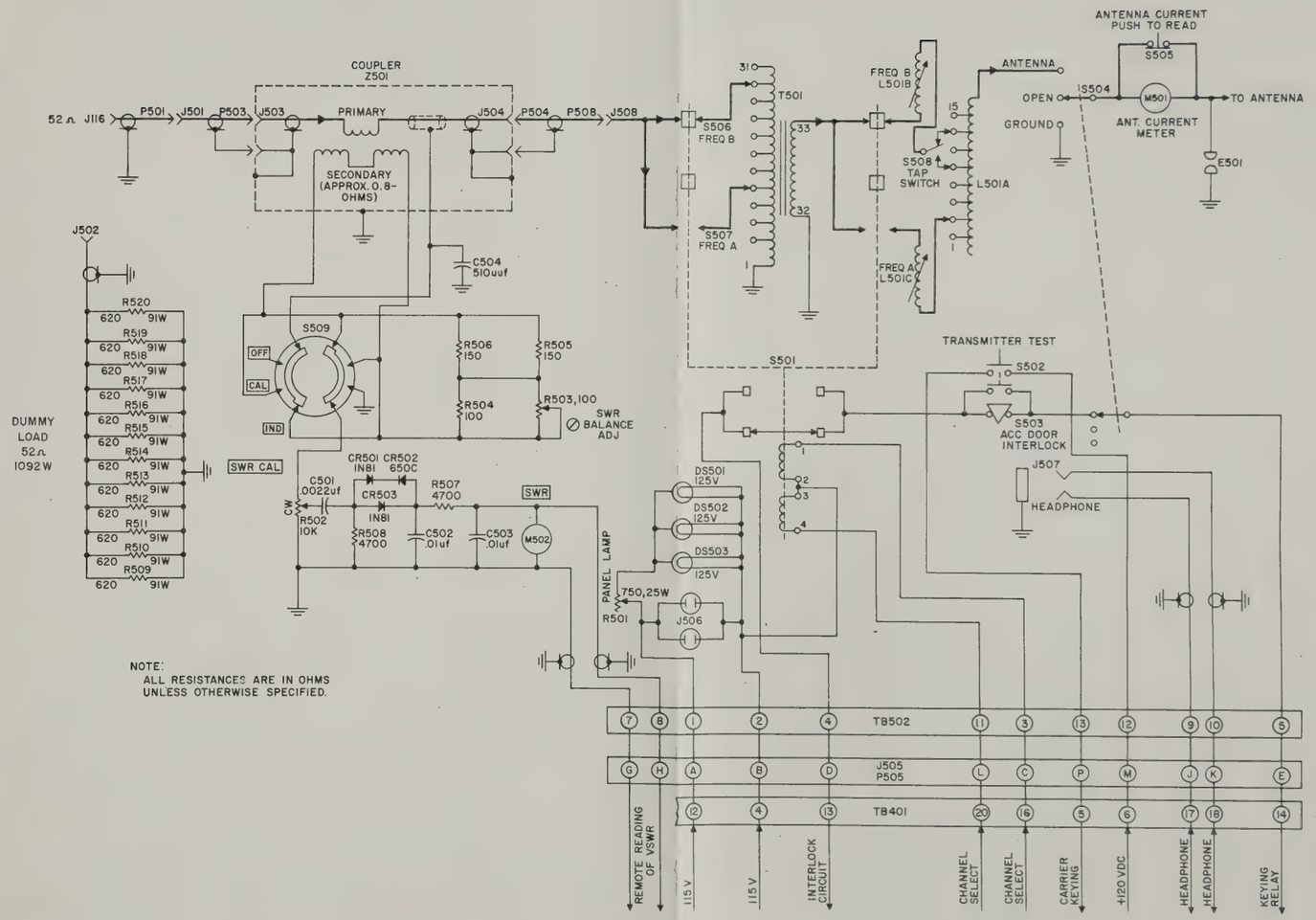



Figure 6-5. Antenna Coupler CU-1064/URT-20 Schematic Diagram

# SECTION 7

# PARTS LIST

## 7-1. INTRODUCTION.

Reference designations circuit have been assigned to identify maintenance parts of the equipment. They are shown on illustrations where applicable and in this parts list as well as on the equipment itself (marked adjacent to the parts they identify). The letters of a reference designation indicate the kind of part (generic group) such as resistor, capacitor, transistor, etc. The number differentiates between parts of the same generic group. Parts of this equipment have been assigned the number groups 100, 200, 300, 400 and 500. Sockets associated with certain parts such as fuses are identified with a reference designation which includes the reference designation of the part. For example, the fuseholder for fuse F101 is designated XF101.

## 7-2. MAINTENANCE PARTS LIST.

Tables 7-1 and 7-2 identify maintenance parts for this equipment. Column listings are as follows:

a. The "Ref. Desig." column lists the reference designations in alpha-numerical sequence.

b. The "Notes" column refers to the explanatory notes that may be required.

c. The "Name and Description" column gives the basic name and description of the parts. Complete descriptive information is given only for a part the first time the part appears in the list. All such parts are called key parts. For all subsequent listings of identical parts, reference is made to the key part.

d. The "Locating Function" column indicates the functional use and location of the part in the equipment and the number of the figure on which the part is illustrated.

## 7-3. STOCK NUMBER IDENTIFICATION.

When ordering replacement parts, refer to the latest SNIT (Stock Number Identification Table) issued by the CG supply center.

## 7-4. LIST OF MANUFACTURERS.

Table 7-3 lists the name and address of the manufacturers of parts used in this equipment and the corresponding Federal Supply Code assigned in Cataloging Handbook H4-1.

TABLE 7-1. LIST OF MAJOR UNITS

| REF. DESIG. | QTY. | NAME OF MAJOR UNIT | COLLOQUIAL NAME |
|---|---|---|---|
| 101 to 199 | 1 | Power Supply PP-3385/URT-20 | Power Supply |
| 201 to 299 | 1 | Amplifier-Oscillator AM-3340/URT-20 | Amplifier-Oscillator |
| 301 to 399 | 1 | Radio Frequency Amplifier AM-3341/URT-20 | RF Amplifier |
| 401 to 499 | 1 | Electrical Equipment Cabinet CY-3623/URT-20 | Cabinet |
| 501 to 599 | 1 | Antenna Coupler CU-1064/URT-20 | Antenna Coupler |

TABLE 7-2. MAINTENANCE PARTS LIST

POWER SUPPLY PP-3385/URT-20

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| C101 | | CAPACITOR, FIXED, PAPER DIELECTRIC: 4 UF, ±10%, 4000VDCW; MIL type CP70E1EM405K | Power Supply filter Figure 5-4 |
| C102 | | Same as C101 | Power Supply filter Figure 5-4 |
| C103 | | CAPACITOR, FIXED: 22 UF, ±10%, 35VDCW;(56289 P/N 150D226X0035R2) | +12V Supply filter Figure 5-5 |
| CB101 | | CIRCUIT BREAKER: 3 phase, 250VAC, 15 amp, 3 pole, Delay Curve #3; (74193 P/N 3363) | Off-on Circuit breaker Figure 5-4 |
| CR101 | | SEMICONDUCTOR DEVICE, DIODE: 1N1217 | 12V rectifier Figure 5-5 |
| CR102 | | Same as CR101 | 12V rectifier Figure 5-5 |
| CR103 thru CR168 | | SEMICONDUCTOR DEVICE, DIODE: 1N1224 | High voltage rectifier Figure 5-5 |
| DS101 | | LAMP, INCANDESCENT: Cand. screw, 230VAC, 10 watt, type 10S6/10 | Power On Figure 3-1 |
| DS102 | | Same as DS101 | High voltage On Figure 3-1 |
| F101 | | FUSE: 3 amp, 250V, SLOW-BLOW (71400 P/N MDA-3A) | Line fuse Figure 3-1 |
| F102 | | Same as F101 | Spare fuse Figure 3-1 |
| J101 | | CONNECTOR, RECEPTACLE, ELECTRICAL: MS3102A-28-9P | P. S. breakaway connector Figure 5-4 |
| J102 | | CONNECTOR, RECEPTACLE, ELECTRICAL: MS3102A-28-11S | P. S. breakaway connector Figure 5-4 |
| J103 | | CONNECTOR, RECEPTACLE, ELECTRICAL: (02660 P/N 97-3102A-18-420S) | HV connector Figure 5-4 |
| K101 | | RELAY: 3 phase, 3 pole, 220 volt coil, 10 amp contacts, (01121 P/N 702A0A92) | HV relay Figure 5-4 |
| K101A | | COIL, RELAY: (01121 P/N 70A06) | |
| K101B | | CONTACT SET, RELAY: (01121 P/N X-247278) | |
| K102 | | Same as K101 | HV relay Figure 5-4 |
| K102A | | Same as K101A | |
| K102B | | Same as K101B | |
| K103 | | RELAY, OVERLOAD: Couble coil, 0.750 amp DC set, 12VDC reset (77342 P/N KB1209) | Overload relay Figure 5-4 |
| K104 | | RELAY: 4PDT (94696 P/N W22AHSX-32) | Start-stop relay Figure 5-4 |
| L101 | | CHOKE: TF1RX04YY, 1 henry, 0.75 amp DC, 6000VAC test; (02572 Dwg No. B647-3119) | Filter choke Figure 5-4 |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| P101 | | CONNECTOR, PLUG, ELECTRICAL: MS3108B-28-9S | P. S. chassis connector Figure 2-6 |
| P102 | | CONNECTOR, PLUG, ELECTRICAL: MS3108B-28-11P | P. S. chassis connector Figure 2-6 |
| P103 | | CONNECTOR, PLUG, ELECTRICAL: (02660 P/N 97-3108B-18-420P) | HV connector Figure 2-6 |
| R101 | | RESISTOR, FIXED, COMPOSITION: 1 ohm, ±1%, 1 watt; (91637 P/N RS-1B) | 12V current limiting resistor Figure 5-5 |
| R102 | | RESISTOR, FIXED, WIRE WOUND: 910 ohm, 18 watt; RW33G911 | Start-stop current limiter Figure 5-4 |
| R103 | | RESISTOR, FIXED, WIRE WOUND: 1750 ohm, 10 watt; (44655 P/N 1741) | Time delay resistor Figure 5-4 |
| R104 | | Same as R101 | 12V current limiter Figure 5-5 |
| R105 thru R170 | | RESISTOR, FIXED, COMPOSITION: 200K, ±10%, 1/2 watt; MIL type RC20GF204K | HV diode suppresssor Figure 5-5 |
| R171 | | RESISTOR, FIXED, WIREWOUND: 75K, 110 watt; MIL type RW38G753 | Bleeder Figure 5-4 |
| R172 | | Same as R171 | Bleeder Figure 5-4 |
| S101 | | SWITCH, PUSH: (15605 P/N 10250ED-433) | Start-stop switch Figures 3-1 and 5-4 |
| S102 | | SWITCH, PUSH: (15605 P/N 8440K2) | Overload reset Figures 3-1 and 5-4 |
| S103 | | SWITCH, TOGGLE: DPDT, MIL type ST52N | Stand-by-operate switch Figures 3-1 and 5-4 |
| T101 | | TRANSFORMER: TF1RX02NA, primary: 198V, 220V, 242V, secondary: 115V 3.5A, 28VCT 1A DC; 1500V RMS test; (02572 Dwg No. B647-3124) | 12V and 115V supply Figure 5-4 |
| T102 | | TRANSFORMER: TF4RX02YY, primary: 210V, 220V, 230V, 1750VAC test; secondary: 1280V 0.25A Avg, 4000VAC RMS test; (02572 Dwg No. B647-3125) | HV B+ supply Figure 5-4 |
| T103 | | Same as T102 | HV B+ supply Figure 5-4 |
| T104 | | Same as T102 | HV B+ supply Figure 5-4 |
| TB101 | | TERMINAL BOARD: (02572 Dwg No. B647-3114) contains the following components: R105 through R137, CR103 through CR135 | Figures 5-4 and 5-5 |
| TB102 | | TERMINAL BOARD: (02572 Dwg No. B647-3115) contains the following components: R138 through R170, CR136 through CR168 | Figures 5-4 and 5-5 |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| TB103 | | TERMINAL BOARD: (02572 Dwg No. B647-3116) contains the following components: CR102, R101, C103, R104, CR101, R102 | Figures 5-4 and 5-5 |
| TD101 | | RELAY, TIME DELAY: Motor driven, motor voltage 115VAC, contact rating 15 amps, adjustable 0 to 1 min. (30703 P/N CSF1M) | Time delay relay Figure 5-4 |
| XDS101 | | LAMPHOLDER: Green, mechanical dimmer, (72619 P/N 71B 4001-112) | DS101 socket Figure 5-4 |
| XDS102 | | LAMPHOLDER: Red, mechanical dimmer, (72619 P/N 71B 4001-111) | DS102 socket Figure 5-4 |
| XF101 | | FUSEHOLDER, INDICATOR: 90-300V, (71400 P/N HKL) | F101 socket |
| XF102 | | FUSEHOLDER, NON-INDICATING: (71400 P/N HKP) | F102 socket |
| A201 | | CIRCUIT BOARD ASSEMBLY: (02572 Dwg No. C-647-1216) contains the following components: T201 through T203, L201 through L206, R201 through R213, CR201, CR202, C201 through C212, Q201, Q202 | Voice modulator board Figure 5-7 |
| A201A | | PRINTED CIRCUIT BOARD: (02572 Dwg No. B-647-3236) | |
| C201 | | CAPACITOR, FIXED, TANTALUM: 22 UF, ±10%, 35VDCW; MIL type CS13AF220K | Q201 coupling Figure 5-7 |
| C202 | | Same as C201 | Q201 coupling Figure 5-7 |
| C203 | | CAPACITOR, FIXED, PAPER DIELECTRIC: 0.068 UF; (04062 P/N IDP-2-683) | P/O modulator filter Figure 5-7 |
| C204 | | CAPACITOR, FIXED, CERAMIC DIELECTRIC: 0.1 UF; (71590 P/N CK-104) | P/O modulator filter Figure 5-7 |
| C205 | | Same as C203 | P/O modulator filter Figure 5-7 |
| C206 | | Same as C204 | P/O modulator filter Figure 5-7 |
| C207 | | CAPACITOR, FIXED, PAPER DIELECTRIC: 0.004 UF; | P/O modulator filter Figure 5-7 |
| C208 | | CAPACITOR, FIXED, PAPER DIELECTRIC: 0.0068 UF; (14655 P/N DPMS 6D68) | P/O modulator filter Figure 5-7 |
| C209 | | CAPACITOR, FIXED, PAPER DIELECTRIC: 0.002 UF; (56289 P/N 6PS-D20) | P/O modulator filter Figure 5-7 |
| C210 | | Same as C208 | P/O modulator filter Figure 5-7 |
| C211 | | Same as C207 | P/O modulator filter Figure 5-7 |
| C212 | | Same as C201 | Q202 coupling Figure 5-7 |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| C213 | | CAPACITOR, FIXED, METALIZED, PAPER DIELECTRIC: 4 UF, ±10%, 600VDCW; MIL type CH53B1NF405M | V201 B+ filter Figure 5-6 |
| C214 | | CAPACITOR, FIXED, PAPER DIELECTRIC: 0.01 UF, ±10%, 200VDCW; MIL type CP05A1EE103K | V201 coupling Figure 5-9 |
| C215 | | CAPACITOR, FIXED, MICA DIELECTRIC: 1600 UUF, ±10%, 500VDCW; MIL type CM20D162K | V201 feedback Figure 5-9 |
| C216 | | CAPACITOR, FIXED, MICA DIELECTRIC: 330 UUF, ±10%, 500VDCW; MIL type CM20C331K | V201 audio filter Figure 5-9 |
| C217 | | CAPACITOR, FIXED, MICA DIELECTRIC: 750 UUF, ±10%, 500VDCW; MIL type CM20C751K | V201 audio filter Figure 5-9 |
| C218 | | CAPACITOR, FIXED, PAPER DIELECTRIC: 2 UF, ±10%, 200VDCW; MIL type CP53B1EC205K | V201 cathode bypass Figure 5-6 |
| C219 | | Same as C213 | V201 screen bypass Figure 5-6 |
| C220 | | CAPACITOR, FIXED, PAPER DIELECTRIC: 0.047 UF, ±5%, 200VDCW; (82376 P/N CP09A1K3473KAQFP) | Feedback capacitor Figure 5-9 |
| C221 | | CAPACITOR, FIXED, PAPER DIELECTRIC: 0.022 UF, ±10%, 200VDCW; MIL type CP09A1KC233K | V203 bypass Figure 5-9 |
| C222 | | CAPACITOR, FIXED, MICA DIELECTRIC: 10 UUF, ±10%, 300VDCW; MIL type CM15B100K3 | V203 screen bypass Figure 6-1 |
| C223 | | CAPACITOR, FIXED, CERAMIC DIELECTRIC: 1000 UUF, 500VDCW; (72982 P/N 327X5V102M) | V207 feedthru Figure 5-7 |
| C224 | | Same as C220 | V207 plate bypass Figure 5-7 |
| C225 | | CAPACITOR, FIXED, MICA DIELECTRIC: 1500 UUF; MIL type CM20E152J | V203 coupling Figure 5-7 |
| C226 | | CAPACITOR, FIXED, MICA DIELECTRIC: 680 UUF, ±10%, 500VDCW; MIL type CM20B681K | V204 feedback Figure 5-9 |
| C227 | | CAPACITOR, FIXED, MICA DIELECTRIC: 47 UUF, ±10%, 500VDCW; MIL type CM20B470K | V204 screen bypass Figure 5-9 |
| C228 | | Same as C214 | V204 plate bypass Figure 5-9 |
| C229 | | Same as C214 | V205 plate bypass Figure 5-8 |
| C230 | | CAPACITOR, FIXED, PAPER DIELECTRIC: 0.02 UF, ±10%, 200VDCW; MIL type CP04A1KC203K | V205 plate coupling Figure 5-8 |
| C231 | | CAPACITOR, FIXED, MICA DIELECTRIC: 39 UUF, ±10%, 500VDCW; MIL type CM20B390K | V204 bypass Figure 5-8 |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| C232 | | Same as C226 | V205 feedback Figure 5-8 |
| C233 | | Same as C227 | V205 screen bypass Figure 5-8 |
| C234 | | Same as C231 | V205 bypass Figure 5-8 |
| C235 | | Same as C230 | V204 plate coupling Figure 5-9 |
| C236 | | CAPACITOR, FIXED, MICA DIELECTRIC: 5 UUF, ±5%, 500VDCW; MIL type CM20C5R0J | V207 network Figure 5-7 |
| C237 | | CAPACITOR, FIXED, CERAMIC DIELECTRIC: 0.02 UF, ±5%, 400VDCW; (72982 P/N ED.02) | V206 plate coupling Figure 5-7 |
| C238 | | CAPACITOR, FIXED, MICA DIELECTRIC: 1500 UUF, ±10%, 500VDCW; MIL type CM20D152K | V206 cathode bypass Figure 5-7 |
| C239 | | Same as C220 | V206 screen bypass Figure 5-7 |
| C240 | | CAPACITOR, FIXED, CERAMIC DIELECTRIC: 5000 UUF, 500VDCW; (72982 P/N 811Z5V502P) | V206 suppressor bypass Figure 5-7 |
| C241 | | Same as C223 | V206 feedthru Figure 5-7 |
| C242 | | Same as C214 | K204 arc suppressor Figure 5-9 |
| C243 | | Same as C220 | V206 plate bypass Figure 5-7 |
| C244 | | Same as C223 | V206 feedthru Figure 5-7 |
| C245 | | Same as C223 | V207 feedthru Figure 5-7 |
| C246 | | Same as C220 | V207 screen bypass Figure 5-7 |
| C247 | | Same as C240 | V207 suppressor bypass Figure 5-7 |
| C248 | | Same as C213 | Low B+ filter Figure 5-6 |
| C249 | | CAPACITOR, FIXED, METALIZED PAPER DIELECTRIC: 1 UF, 400VDCW; (82376 P/N CH10A3EE105M) | Low B+ VR bypass Figure 5-6 |
| C250 | | Same as C213 | Bias filter Figure 5-6 |
| C251 | | Same as C213 | Bias filter Figure 5-6 |
| C252 | | Same as C213 | Low B+ filter Figure 5-6 |
| C253 | | CAPACITOR, FIXED, ELECTROLYTIC: 8 UF, 250VDCW; (14655 P/N BBR825) | Bias filter Figure 5-9 |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| C254 | | CAPACITOR, FIXED, TANTALUM: 47 UF, 35VDCW; (96214 P/N SCM-476HP035A4) | Modulation 12V filter Figure 5-9 |
| C255 thru C258 | | Same as C223 | Filament bypass Figure 5-7 |
| C259 | | CAPACITOR, FIXED, PAPER DIELECTRIC: 0.47 UF, 400VDCW; (00656 P/N P123ZN) | V202 network Figure 5-9 |
| C260 | | Same as C226 | V203 plate bypass Figure 5-9 |
| CR201 | | SEMICONDUCTOR DEVICE, DIODE: Zener, 1N3828A, 6.2V, 0.75W; (04713) | Modulator output limiter Figure 5-7 |
| CR202 | | Same as CR201 | Modulator output limiter Figure 5-7 |
| CR203 thru CR208 | | SEMICONDUCTOR DEVICE, DIODE: 1N445B | Low B+ rectifiers Figure 5-9 |
| CR209 thru CR212 | | Same as CR203 | Bias voltage rectifiers Figure 5-9 |
| CR213 | | SEMICONDUCTOR DEVICE, DIODE: Zener, 1N2976B | Modulator 12V regulator Figure 5-6 |
| F201 | | FUSE, CARTRIDGE: 1 amp, 250V; SLOW-BLOW (71400 P/N MDL-1A) | Line fuse Figure 5-6 |
| F202 | | Same as F201 | Line fuse Figure 5-6 |
| F203 | | Same as F201 | Spare fuse Figure 5-6 |
| F204 | | Same as F201 | Spare fuse Figure 5-6 |
| J201 | | CONNECTOR, RECEPTACLE, ELECTRICAL: MS3102A-22-14P | Amp-Osc connector Figure 5-6 |
| J202 | | CONNECTOR, RECEPTACLE, ELECTRICAL: MS3102A-22-14S | Amp-Osc connector Figure 5-6 |
| J203 | | CONNECTOR, RECEPTACLE, ELECTRICAL: MS3102A-28-19S | Amp-Osc connector Figure 5-6 |
| J204 | | CONNECTOR, RECEPTACLE, ELECTRICAL: (02660 P/N 31-105) | Amp-Osc connector Figure 5-6 |
| J205 | | JACK, HEADPHONE: 2 circuits, (81812 P/N 91-25) | Audio output jack Figure 5-6 |
| K201 | | RELAY: DPDT, coil voltage 12VDC, contact rating 5A; (78277 P/N 42RJ1000S-SIL) | Freq. A-B relay Figure 5-6 |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| K202 | | Same as K201 | Int. mod. relay Figure 5-6 |
| K203 | | Same as K201 | Ext. mod. relay Figure 5-6 |
| K204 | | RELAY: SPDT, coil resis. 130 ohm, operate: volts 3.19, current 22.5ma, octal base, 15 VA gold contacts; (71482 P/N CRA-1806) | Keying relay Figure 5-6 |
| L201 | | REACTOR, MINIDUCTOR: 10 hy, 0.5ma DC, MIL-T-27A; (89665 P/N ML-8) | Mod. filter Figure 5-7 |
| L202 | | REACTOR, MINIDUCTOR: 2.5 hy, 1ma DC; (89665 P/N ML-5) | Mod. filter Figure 5-7 |
| L203 | | Same as L201 | Mod. filter Figure 5-7 |
| L204 | | REACTOR, MINIDUCTOR: 0.4 hy, 7ma DC; (89665 P/N ML-2) | Mod. filter Figure 5-7 |
| L205 | | REACTOR, MINIDUCTOR: 0.7 hy 5ma (89665 P/N ML-3) | Mod. filter Figure 5-7 |
| L206 | | Same as L204 | Mod. filter Figure 5-7 |
| L207 | | REACTOR: 25mh, 100ma; (76493 P/N 957) | V207 plate coil Figure 5-7 |
| L208 | | REACTOR: 10mh, 100ma; (76493 P/N 956) | V207 screen coil Figure 5-7 |
| L209 | | Same as L207 | V206 plate coil Figure 5-7 |
| L210 | | REACTOR: 8.5 h at 250ma, 2500V; MIL-T-27, KB-case 90 ohm; (89665 P/N H-75) | Line filter Figure 5-6 |
| L211 | | Same as L208 | V206 screen coil Figure 5-7 |
| M201 | | VOLTMETER: 0-1VAC 3-1/2", Ruggedized & Sealed Wacline MR36W010AC VVR | Filament supply Figure 5-6 |
| MP201 | | KNOB, POINTER: (49956 P/N 90-5-2G) | Local-remote |
| MP202 | | KNOB, ROUND: (49956 P/N 70-1-2G) | RF drive |
| MP203 | | LOCK, KNOB: (49956 P/N KL701G) | RF drive |
| MP204 | | KNOB: (71590 P/N P-193) | Carrier-on-off-key |
| P201 | | CONNECTOR, PLUG, ELECTRICAL: MS3106A-22-14S | Amp-Osc chassis connector Figure 2-6 |
| P202 | | CONNECTOR, PLUG, ELECTRICAL: MS3106A-22-14P | Amp-Osc chassis connector Figure 2-6 |
| P203 | | CONNECTOR, PLUG, ELECTRICAL: MS3106A-28-19P | Amp-Osc chassis connector Figure 2-6 |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| P204 | | CONNECTOR, PLUG, ELECTRICAL: UG-88/U | Amp-Osc RF output Figure 2-6 |
| Q201 | | TRANSISTOR: 2N335 | Modulator Figure 5-7 |
| Q202 | | Same as Q201 | Modulator Figure 5-7 |
| R201 | | RESISTOR, FIXED, COMPOSITION: 47 ohm, ±10%, 1/2W; MIL type RC20GF470K | Mod. input Xfmr Figure 5-7 |
| R202 | | RESISTOR, FIXED, COMPOSITION: 1K, ±10%, 1/2W; MIL type RC20GF102K | Mod. input limiter Figure 5-7 |
| R203 | | RESISTOR, FIXED, COMPOSITION: 1.5K, ±10%, 1/2W; MIL type RC20GF152K | Q201 base bias Figure 5-7 |
| R204 | | RESISTOR, FIXED, COMPOSITION: 20K, ±10%, 1/2W; MIL type RC20GF203K | Q201 base bias Figure 5-7 |
| R205 | | RESISTOR, FIXED, COMPOSITION: 8.2K, ±10%, 1/2W; MIL type RC20GF822K | Q201 collector load Figure 5-7 |
| R206 | | RESISTOR, FIXED, COMPOSITION: 180 ohm, ±10%, 1/2W; MIL type RC20GF181K | Q201 emitter bias Figure 5-7 |
| R207 | | RESISTOR, VARIABLE: 10K; (80294 P/N 3367P-1-103) | Mod. output resistor Figure 5-7 |
| R208 | | RESISTOR, FIXED, COMPOSITION: 10 ohm, ±10%, 1/2W; MIL type RC20GF100K | Voltage dropping resistor Figure 5-7 |
| R209 | | Same as R208 | Voltage dropping resistor Figure 5-7 |
| R210 | | Not used. | |
| R211 | | RESISTOR, FIXED, COMPOSITION: 2.2K, ±10%, 1/2W; MIL type RC20GF222K | Q202 base bias resistor Figure 5-7 |
| R212 | | RESISTOR, FIXED, COMPOSITION: 18K, ±10%, 1/2W; MIL type RC20GF183K | Q202 base bias resistor Figure 5-7 |
| R213 | | RESISTOR, VARIABLE: 20K; (80294 P/N 3367P-1-203) | Mod. output resistor Figure 5-7 |
| R214 | | RESISTOR, FIXED, COMPOSITION: 150K, ±10%, 1/2W; MIL type RC20GF154K | V201 grid load Figure 5-9 |
| R215 | | RESISTOR, FIXED, COMPOSITION: 56K, ±10%, 1W; MIL type RC32GF563K | V201 plate load Figure 5-9 |
| R216 | | RESISTOR, FIXED, COMPOSITION: 6.8K, ±10%, 1W; MIL type RC32GF682K | V201 voltage dropping Figure 5-9 |
| R217 | | RESISTOR, FIXED, COMPOSITION: 1K, ±10%, 1/2W; MIL type RC20GF102K | V201 cathode bias Figure 5-9 |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| R218 | | RESISTOR, VARIABLE, COMPOSITION: 250K, ±10%, 2W; MIL type RV4LAYSA254A | Frequency control Figure 5-6 |
| R219 | | RESISTOR, FIXED, COMPOSITION: 270K, ±10%, 1/2W; MIL type RC20GF274K | V201 screen dropping Figure 5-9 |
| R220 | | RESISTOR, FIXED, COMPOSITION: 100K, ±10%, 1/2W; MIL type RC20GF104K | V201 network Figure 5-9 |
| R221 | | RESISTOR, FIXED, COMPOSITION: 33K, ±10%, 1/2W; MIL type RC20GF333K | V201 network Figure 5-9 |
| R222 | | RESISTOR, VARIABLE, COMPOSITION: 500K, ±10%, 2W; MIL type RV4LAYSA504A | Audio osc. output control Figure 5-6 |
| R223 | | RESISTOR, FIXED, COMPOSITION: 150K, ±10%, 1/2W; MIL type RC20GF154K | V202 grid load Figure 5-9 |
| R224 | | RESISTOR, FIXED, COMPOSITION: 3.3K, ±10%, 1W; MIL type RC32GF332K | V202 cathode bias Figure 5-9 |
| R225 | | RESISTOR, FIXED, COMPOSITION: 470K, ±10%, 1/2W; MIL type RC20GF474K | V202 audio feedback Figure 5-9 |
| R226 | | RESISTOR, VARIABLE, COMPOSITION: 25K, ±10%, 2W; MIL type RV4LAYSA253A | V203 RF input control Figure 5-6 |
| R227 | | RESISTOR, FIXED, COMPOSITION: 22K, ±10%, 1W; MIL type RC32GF223K | V202 plate limiting Figure 5-9 |
| R228 | | RESISTOR, FIXED, COMPOSITION: 33K, ±10%, 2W; MIL type RC42GF333K | V202 plate load Figure 5-9 |
| R229 | | RESISTOR, VARIABLE, COMPOSITION: 50 ohm, ±10%, 2W; MIL type RV4LAYSA500A | RF DRIVE |
| R230 | | RESISTOR, VARIABLE, COMPOSITION: 5K, ±10%, 2W; MIL type RV4LAYSA502A | V203 mixer bias control Figure 5-6 |
| R231 | | RESISTOR, VARIABLE, COMPOSITION: 50K, ±10%, 2W; MIL type RV4LAYSA503K | Bias limiting control Figure 5-6 |
| R232 | | Same as R215 | V208 current limiter Figure 5-9 |
| R233 | | RESISTOR, FIXED, COMPOSITION: 47K, ±10%, 1W; MIL type RC32GF473K | V207 plate dropping Figure 5-7 |
| R234 | | Same as R231 | V204 grid bias control Figure 5-8 |
| R235 | | RESISTOR, FIXED, COMPOSITION: 47K, ±10%, 1/2W; MIL type RC20GF473K | V204 screen dropping Figure 5-8 |
| R236 | | Same as R235 | V204 plate load Figure 5-8 |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| R237 | | Same as R202 | V204 B+ dropping Figure 5-8 |
| R238 | | Same as R202 | V205 B+ dropping Figure 5-8 |
| R239 | | Same as R235 | V205 screen dropping Figure 5-8 |
| R240 | | Same as R235 | V205 plate load Figure 5-8 |
| R241 | | RESISTOR, FIXED, COMPOSITION: 390 ohm, ±10%, 1/2W; MIL type RC20GF391K | V204 cathode bias Figure 5-8 |
| R242 | | Same as R231 | V205 grid bias control Figure 5-9 |
| R243 | | Same as R241 | V205 cathode bias Figure 5-8 |
| R244 | | RESISTOR, VARIABLE, COMPOSITION: 150K, ±10%, 2W; MIL type RV4LAYSA154A | V204 RF Osc output control Figure 5-8 |
| R245 | | Same as R244 | V205 RF Osc output control Figure 5-8 |
| R246 | | Same as R225 | V207 network Figure 5-7 |
| R247 | | RESISTOR, FIXED, COMPOSITION: 68 ohm, ±10%, 2W; MIL type RC42GF680K | K204 current limiter Figure 5-9 |
| R248 | | RESISTOR, FIXED, COMPOSITION: 330 ohm, ±10%, 1/2W; MIL type RC20GF331K | V206 cathode bias Figure 5-7 |
| R249 | | Same as R220 | V206 grid load Figure 5-8 |
| R250 | | Same as R220 | V206 grid load Figure 5-8 |
| R251 | | RESISTOR, FIXED, COMPOSITION: 33K, ±10%, 1W; MIL type RC32GF333K | V206 plate load Figure 5-7 |
| R252 | | Same as R211 | V207 cathode bias Figure 5-7 |
| R253 | | Same as R204 | V208 bias resistor Figure 5-9 |
| R254 | | RESISTOR, FIXED, COMPOSITION: 18K, ±10%, 2W; MIL type RC42GF183K | Voltage dropping Figure 5-9 |
| R255 | | RESISTOR, FIXED, COMPOSITION: 100K, ±10%, 2W; MIL type RC42GF104K | Voltage dropping Figure 5-9 |
| R256 | | RESISTOR, FIXED, COMPOSITION: 27K, ±10%, 1W; MIL type RC32GF273K | V208 bias resistor Figure 5-9 |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| R257 | | Same as R210 | V207 grid load Figure 5-7 |
| R258 | | RESISTOR, FIXED, COMPOSITION: 100K, ±10%, 1W; MIL type RC32GF104K | V207 screen dropping Figure 5-9 |
| R259 | | RESISTOR, FIXED, COMPOSITION: 33 ohm, ±10%, 1/2W; MIL type RC20GF330K | K204 arc suppressor Figure 5-9 |
| R260 | | Same as R228 | V206 screen dropping Figure 5-9 |
| R261 | | RESISTOR, FIXED, WIRE WOUND: 1500 ohm, 10W; (44655 P/N 3806) | Low B+ dropping resistor Figure 5-6 |
| R262 | | RESISTOR, FIXED, WIRE WOUND: 1250 ohm, 25W; (44655 P/N 0375B) | Low B+ VR resistor Figure 5-6 |
| R263 | | RESISTOR, FIXED, COMPOSITION: 2K, ±10%, 2W; MIL type RC42GF202K | Bias voltage dropping Figure 5-9 |
| R264 | | RESISTOR, FIXED, WIRE WOUND: 3K, 10W; (44655 P/N 1745) | Bias voltage dropping Figure 5-6 |
| R265 | | RESISTOR, FIXED, COMPOSITION: 220K, ±10%, 1/2W; MIL type RC20GF224K | Low B+ diode suppressor Figure 5-9 |
| R266 | | Same as R265 | Low B+ diode suppressor Figure 5-9 |
| R267 thru R270 | | Same as R265 | Bias diode suppressor Figure 5-9 |
| R271 thru R274 | | Same as R265 | Low B+ diode suppressor Figure 5-9 |
| R275 | | Same as R228 | Mod. B+ voltage dropping Figure 5-9 |
| R276 | | RESISTOR, FIXED, COMPOSITION: 47K, ±10%, 2W; MIL type RC42GF473K | Mod. B+ voltage dropping Figure 5-9 |
| S201 | | SWITCH, TOGGLE: (71590 P/N 1467) | Carrier on-off switch Figure 5-6 |
| S202 | | SWITCH, ROTARY: 1 section, 10PDT non-shorting; (71590 P/N PA-2031) | Local-remote switch Figure 5-6 |
| S203 | | SWITCH, TOGGLE: SPDT; MIL type ST-12A | Crystal freq. selector switch Figure 5-6 |
| S204 | | SWITCH: MIL type ST-40E | Mod-int-ext switch Figure 5-6 |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| T201 | | TRANSFORMER, TRANSISTOR: 500 ohm primary: 3.5ma unbal, DC resistance 50 ohm; 50 ohm secondary: DC resistance 5 ohm; max power +20DBM; (89665 P/N SS0-11) | Mod. input xfmr Figure 5-7 |
| T202 | | TRANSFORMER, TRANSISTOR: 10,000 ohm primary: 1ma DC, DC resistance 780 ohm; 1200 ohm CT secondary: max power 100mw; (89665 P/N DO-T10) | Mod. interstage xfmr Figure 5-7 |
| T203 | | TRANSFORMER, TRANSISTOR: 10,000 ohm CT primary: 1ma DC, DC resistance 650 ohm, 200 ohm CT secondary: DC resistance 22 ohm; max power +20DBM; (89665 P/N SSO-14) | Mod. output xfmr Figure 5-7 |
| T204 | | TRANSFORMER, AUDIO: 15,000 ohm primary: DC unbalance 8ma; 80,000 ohm split secondary: max power level 200mw; (89665 P/N H-21) | Modulation xfmr Figure 5-6 |
| T205 | | TRANSFORMER, R.F.: Primary: 225 turns 7/44 litz; secondary 15 turns 7/44 litz on ferrite core; (02572 Dwg No. B647-1200) | RF interstage xfmr Figure 5-6 |
| T206 | | TRANSFORMER: TF1RX02LB, primary: 198V, 220V, 242V, 1500V RMS test; secondary: 700VCT, 200ma DC 2200V RMS test, per MIL-T-27; (02572 Dwg No. B647-3246) | 300 volt supply xfmr Figure 5-6 |
| T207 | | TRANSFORMER: TF1RX03MA, primary: 198V, 220V, 242V, 2000V RMS test; secondary: No. 1 -5VCT 15A; No. 2 -5VCT 15A; No. 3 -440VCT 0.025A; No. 4 -6.3V 3A, per MIL-T-27; (02572 Dwg No. B647-3245) | -150 volt supply xfmr Figure 5-6 |
| TB201 | | TERMINAL BOARD: (02572 Dwg No. A-647-3205) contains the following components: R241, R243, R249, R250, C231, C234 | Figure 5-8 |
| TB202 | | TERMINAL BOARD: (02572 Dwg No. A-647-3207) contains the following components: R238, R239, R240, C229, C230, C232, C233 | Figure 5-8 |
| TB203 | | TERMINAL BOARD: (02572 Dwg No. A-647-3207) contains the following components: R235, R236, R237, C226, C227, C228, C235 | Figure 5-8 |
| TB204 | | TERMINAL BOARD: (02572 Dwg No. A-647-3207) contains the following components: R246, R248, R251, C236, C237, C238, C240, C243, L209 | Figure 5-7 |
| TB205 | | TERMINAL BOARD: (02572 Dwg No. A-647-3207) contains the following components: R233, R252, R257, C224, C225, C247, L207 | Figure 5-7 |
| TB206 | | TERMINAL BOARD: (02572 Dwg No. A-647-3211) contains the following components: R216, R225, R253, R254, R259, R260, C220, C242 | Figure 5-9 |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| TB207 | | TERMINAL BOARD: (02572 Dwg No. A-647-3214) contains the following components: R228, R247, R255, R256, R258, R263, R267, R268, R269, R270, C259, CR209, CR210, CR211, CR212 | Figure 5-9 |
| TB208 | | TERMINAL BOARD: (02572 Dwg No. A-647-3214) contains the following components: R214, R215, R217 R219, R220, R221, R223, R224, R227, R232, C214, C215, C216, C217, C221, C260 | Figure 5-9 |
| TB209 | | TERMINAL BOARD: (02572 Dwg No. A-647-3219) contains the following components: R265, R266, R271, R272, R273, R274, R275, R276, C253, C254, CR203, CR204, CR205, CR206, CR207, CR208 | Figure 5-9 |
| TP201 | | JACK, TIP: Black; (83330 P/N 202) | V202 grid Figure 5-6 |
| V201 | | ELECTRON TUBE: 5749/6BA6W | Audio oscillator Figure 5-6 |
| V202 | | ELECTRON TUBE: 6AU6WA | Audio amplifier Figure 5-6 |
| V203 | | Same as V202 | Mixer Figure 5-6 |
| V204 | | Same as V202 | RF oscillator Figure 5-8 |
| V205 | | Same as V202 | RF oscillator Figure 5-8 |
| V206 | | Same as V202 | Keyer amplifier Figure 5-6 |
| V207 | | Same as V202 | Keyer amplifier Figure 5-6 |
| V208 | | ELECTRON TUBE: 5651 | Bias voltage regulator Figure 5-6 |
| V209 | | ELECTRON TUBE: 0A2 | Low B+ voltage regulator Figure 5-6 |
| V210 | | Same as V209 | Low B+ voltage regulator Figure 5-6 |
| XF201 | | Same as XF101 | F201 socket Figure 5-6 |
| XF202 | | Same as XF101 | F202 socket Figure 5-6 |
| XF203 | | Same as XF102 | F203 socket Figure 5-6 |
| XF204 | | Same as XF102 | F204 socket Figure 5-6 |
| XK204 | | SOCKET, ELECTRON TUBE: Octal; MIL type TS101P01 | K204 socket Figure 5-6 |
| XQ201 | | SOCKET, TRANSISTOR: (73690 P/N 05-3303) | Q201 socket Figure 5-7 |
| XQ202 | | Same as XQ201 | Q202 socket Figure 5-7 |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| XV201 thru XV210 | | SOCKET, ELECTRON TUBE: 7-pin miniature; MIL type TS102P03 | V201 thru V210 sockets Figure 5-6 |
| XY201 thru XY205 | | SOCKET, CRYSTAL: MIL type TS0205C01 | Y201 thru Y205 sockets Figure 5-8 |
| Y201 thru Y205 | | CRYSTAL: JKD type H17CR47/U | RF oscillator Figure 5-8 |
| B301 | | FAN, CENTRIFUGAL: 230VAC Motor, 3350RPM; (82877 P/N 21-8AS) | V303 and V305 cooling Figure 5-10 |
| C301 | | CAPACITOR, FIXED: 0.01 UF, 600V; MIL type CK63Y103Z | V301 coupling Figure 5-11 |
| C302 | | Same as C227 | V302 coupling Figure 5-11 |
| C303 | | CAPACITOR, FIXED: 0.047 UF; (56289 P/N 6DP-3-473) | V302 screen bypass Figure 5-11 |
| C304 | | CAPACITOR, FIXED, PAPER DIELECTRIC: 0.1 UF, ±10%, 200VDCW; MIL type CP05A1EC104K | V301 grid bypass Figure 5-11 |
| C305 | | CAPACITOR, FIXED, PAPER DIELECTRIC: 0.22 UF, ±10%, 200VDCW; MIL type CP05A1KF224K | V301 plate bypass Figure 5-11 |
| C306 | | Same as C214 | V303 grid bypass Figure 5-11 |
| C307 | | Same as C214 | V305 grid bypass Figure 5-11 |
| C308 | | CAPACITOR, FIXED, MICA DIELECTRIC: 0.01 UF, ±5%, 300VDCW; MIL type CM35E103JN3 | V303 cathode bypass Figure 5-10 |
| C309A and C309B | | CAPACITOR, FIXED: 2X2 UF; (82376 P/N MD-4-2X2) | V303 and V305 filament bypass Figure 5-10 |
| C310 | | Same as C308 | V305 cathode bypass Figure 5-10 |
| C311 | | Not used | |
| C312 | | CAPACITOR, FIXED, MICA DIELECTRIC: 0.01 UF, 1200VDCW; (56289 P/N YFM-11) | M301 HV filter capacitor Figure 5-10 |
| C313 | | Same as C303 | V304 screen bypass Figure 5-11 |
| C314 | | Same as C213 | V302 and V304 plate bypass Figure 5-10 |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| C315 | | Same as C227 | V304 coupling Figure 5-11 |
| C316 | | CAPACITOR, FIXED, MICA DIELECTRIC: 0.005 UF, 3000VDCW; (56289 P/N 2MC-25) | M301 HV filter capacitor Figure 5-10 |
| C317 | | CAPACITOR, FIXED, PAPER DIELECTRIC: 0.01 UF, ±10%, 200VDCW; MIL type CP09A1EC103K | CR301 filter Figure 5-10 |
| C318 | | CAPACITOR, FIXED, PAPER DIELECTRIC: 0.5 UF, 600V; MIL type CP53B1FF504K | Blower motor shunt Figure 5-10 |
| CR301 | | SEMICONDUCTOR DEVICE, DIODE: 1N34A | RF ammeter detector Figure 5-10 |
| DS301 | | LAMP, GLOW: NE-58 | Open interlock indicator Figure 5-10 |
| E301 | | PLATE CAP, HEAT DISSIPATING: E1MAC HR-6 | |
| E302 | | Same as E301 | |
| FL301 | | FILTER: R.F., low pass, 50 ohm input and output impedance, power level 1000 watts, attenuation 1db max 300 to 535KC 45db min. 650 to 3000KC; Includes J301 and J310; (02572 Dwg No. D647-1307) | RF output filter Figure 5-10 |
| J301 | | CONNECTOR, RECEPTACLE, ELECTRICAL: UG-58/U | P/O FL301 Figure 5-10 |
| J302 | | Same as J204 | RF meter connector Figure 5-10 |
| J303 | | Same as J204 | RF input connector Figure 5-10 |
| J304 | | CONNECTOR, RECEPTACLE, ELECTRICAL: MS3102A-28-19P | RF ampl. connector Figure 5-10 |
| J305 | | CONNECTOR, RECEPTACLE, ELECTRICAL: (02660 P/N 97-3102A-18-420P) | HV connector Figure 5-10 |
| J306 | | CONNECTOR, RECEPTACLE, ELECTRICAL: MS3102A-20-33P | RF ampl. connector Figure 5-10 |
| J307 | | CONNECTOR, RECEPTACLE, ELECTRICAL: UG-58/U | P/O T305 Figure 5-10 |
| J308 | | Same as J307 | P/O T305 Figure 5-10 |
| J309 | | Same as J301 | RF output connector Figure 5-10 |
| J310 | | Same as J307 | P/O FL301 Figure 5-10 |
| M301 | | AMMETER: 3-1/2" round, 0-1ma DC, coil resistance 80 ohm, Wacline AED-3131 with special scale (02572 Dwg No. B647-3347) | Test meter Figure 5-10 |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| MP301 | | Same as MP201 | Meter selector switch knob |
| P301 | | CONNECTOR, PLUG, ELECTRICAL: UG-21B/U | Part of W301 Figure 5-10 |
| P302 | | Not used | |
| P303 | | Same as P204 | RF input cable connector Figure 2-6 |
| P304 | | CONNECTOR, PLUG, ELECTRICAL: MS3106A-28-19S | RF ampl. cable Figure 2-6 |
| P305 | | CONNECTOR, PLUG, ELECTRICAL: (02660 P/N 97-3106A-18-420S) | HV cable connector Figure 2-6 |
| P306 | | CONNECTOR, PLUG, ELECTRICAL: MS3106A-20-33S | RF ampl. cable Figure 2-6 |
| P307 | | Not used | |
| P308 | | Same as P301 | Part of W301 Figure 5-10 |
| P309 | | Same as P301 | Part of W302 Figure 5-10 |
| P310 | | Same as P301 | Part of W302 Figure 5-10 |
| R301 | | Same as R224 | V303 current limiter Figure 5-10 |
| R302 | | RESISTOR, FIXED, COMPOSITION: 2.2M, ±10%, 1/2W; MIL type RC20GF225K | V301 grid resistor Figure 5-11 |
| R303 | | RESISTOR, FIXED, COMPOSITION: 3.9K, ±10%, 1W; MIL type RC32GF392K | V301 cathode bias Figure 5-11 |
| R304 | | Same as R254 | V301 plate load Figure 5-11 |
| R305 | | RESISTOR, FIXED, COMPOSITION: 27K, ±10%, 2W; MIL type RC42GF273K | V301 plate load Figure 5-11 |
| R306 | | Not used | |
| R307 | | Not used | |
| R308 | | Same as R225 | V302 grid load Figure 5-11 |
| R309 | | RESISTOR, FIXED, COMPOSITION: 4.7K, ±10%, 1/2W; MIL type RC20GF472K | V302 screen dropping Figure 5-11 |
| R310 | | RESISTOR, FIXED, WIRE WOUND: 60K, ±5%, 200W; (44655 P/N 0923) | Final screen dropping Figure 5-10 |
| R311 | | Same as R309 | V304 screen dropping Figure 5-11 |
| R312 | | Same as R219 | B+ voltage divider Figure 5-11 |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| R313 | | RESISTOR, FIXED, COMPOSITION: 1M, ±10%, 1/2W; MIL type RC20GF105K | B+ dropping resistor Figure 5-11 |
| R314 | | Same as R313 | B+ dropping resistor Figure 5-11 |
| R315 | | Same as R225 | V304 grid load Figure 5-11 |
| R316 | | Same as R224 | V305 current limiter Figure 5-10 |
| R317 | | RESISTOR, FIXED, FILM: 324 ohm, ±1%, 1/4W; MIL type RN10X3240F | M301 voltage divider Figure 5-11 |
| R318 | | Same as R101 | M301 voltage divider Figure 5-11 |
| R319 | | Same as R317 | M301 voltage divider Figure 5-11 |
| R320 | | Same as R101 | M301 voltage divider Figure 5-11 |
| R321 | | RESISTOR, VARIABLE, COMPOSITION: 15K, ±10%, 2W; MIL type RV4LAYSA153K | V303 bias control Figure 5-10 |
| R322 | | Same as R204 | V303 bias dropping Figure 5-11 |
| R323 | | Same as R204 | V305 bias dropping Figure 5-11 |
| R324 | | Same as R321 | V305 bias control Figure 5-10 |
| R325 | | RESISTOR, FIXED, WIREWOUND: 100K, ±5%, 25W; (44655 P/N 0229) | VR shunt Figure 5-10 |
| R326 | | RESISTOR, FIXED, FILM: 1M, ±1%, 2W; MIL type RN30B1004F | Screen voltage divider Figure 5-11 |
| R327 | | Same as R326 | Screen voltage divider Figure 5-11 |
| R328 | | RESISTOR, FIXED, FILM: 80.6 ohm, ±1%, 1/4W; MIL type RN10X80R6F | Screen voltage divider Figure 5-11 |
| R329 | | Same as R230 | RF indicator adjust Figure 5-10 |
| R330 | | Same as R328 | HV voltage divider Figure 5-11 |
| R331 thru R335 | | RESISTOR, FIXED, FILM: 10M, ±1%, 2W; MIL type RN30B1005F | HV voltage divider Figure 5-11 |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| R336 | | RESISTOR, FIXED, FILM: 200K, ±1%, 1/2W; MIL type RN70B2003F | M301 dropping Figure 5-11 |
| R337 | | Same as R336 | M301 dropping Figure 5-11 |
| R338 | | Same as R336 | M301 dropping Figure 5-11 |
| R339 | | Same as R231 | Drive Bias Figure 5-10 |
| R340 | | Same as R225 | M301 dropping Digure 5-11 |
| R341 | | RESISTOR, FIXED, COMPOSITION: 100 ohm, ±10%, 1/2W; MIL type RC20GF101K | RF ammeter dropping Figure 5-10 |
| S301 | | SWITCH, TOGGLE: SPDT; MIL type ST-13D | Tune-operate switch Figure 5-10 |
| S302 | | SWITCH, ROTARY: 2 pole, 11 position; (71590 P/N 2005) | Circuit voltage meter switch Figure 5-10 |
| S303 | | SWITCH, AIRFLOW: 735 FPM airflow actuation; (82877 model 2A with type 1000 vane) | Final blower air flow switch Figure 5-10 |
| S303A | | MICROSWITCH: (82877 type V4-14) | |
| S303B | | ACTUATOR: (82877 type 1000) | |
| T301 | | TRANSFORMER: R. F., primary: 25 turns 7/44 Litz wire; secondary: 150 turns 7/44 Litz wire, on ferrite core; (02572 Dwg No. B647-1306) | Input xfmr Figure 5-10 |
| T302 | | TRANSFORMER: R. F., primary: 100 turns center tapped 7/44 Litz wire; secondary: 90 turns center tapped 7/44 Litz wire, on ferrite core; (02572 Dwg No. B647-1303) | Driver xfmr Figure 5-10 |
| T303 | | TRANSFORMER: R. F., output, primary: 42 turns #26 wire, secondary: 12 turns of 4 no. 22 wires, on ferrite core; (02572 Dwg No. D647-1304) | Output xfmr Figure 5-10 |
| T304 | | TRANSFORMER: R. F., output, primary: 42 turns #26 wire, secondary: 12 turns of 4 no. 22 wires, on ferrite core; includes J309; (02572 Dwg No. D647-1305) | Output xfmr Figure 5-10 |
| T305 | | TRANSFORMER: Current R. F., primary: straight length of #16 wire, secondary: 100 turns #28 wire, on ferrite core; includes J307, J308, C317, R341 and CR301; (02572 Dwg No. C647-1301) | RF current xfmr Figure 5-10 |
| TB301 | | TERMINAL BOARD: (02572 Dwg No. A647-3311) contains the following components: R317, R318, R319, R320, R340, C306, C307 | Figure 5-11 |
| TB302 | | Not used | |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| TB303 | | TERMINAL BOARD: (02572 Dwg No. A647-3311) contains the following components: R309, R311, R322, R323, R328, R330, R336, C303, C313 | Figure 5-11 |
| TB304 | | TERMINAL BOARD: (02572 Dwg No. A647-3314) contains the following components: R326, R327, R331, R334, R337, R338, C305 | Figure 5-11 |
| TB305 | | TERMINAL BOARD: (02572 Dwg No. A647-3317) contains the following components: R332, R333, R335 | Figure 5-11 |
| TB306 | | TERMINAL BOARD: (02572 Dwg No. A647-3318) contains the following components: R302, R304, R308, R314, C301, C302, C304 | Figure 5-11 |
| TB307 | | TERMINAL BOARD: (02572 Dwg No. A647-3318) contains the following components: R303, R305, R312, R313, R315, C315 | Figure 5-11 |
| V301 | | ELECTRON TUBE: 12AT7WA | Phase inverter Figure 5-10 |
| V302 | | ELECTRON TUBE: 6005 | Driver amplifier Figure 5-10 |
| V303 | | ELECTRON TUBE: (Eimac 4-400A) | Final power amplifier Figure 5-10 |
| V304 | | Same as V302 | Driver amplifier Figure 5-10 |
| V305 | | Same as V303 | Final power amplifier Figure 5-10 |
| V306 thru V310 | | Same as V209 | Screen voltage regulators Figure 5-10 |
| W301 | | CABLE ASSEMBLY: RF output; consists of: 6-1/2" RG-8/U, P301 and P308; (02572 Dwg No. A647-2300) | Connects FL301 to T305 Figure 5-10 |
| W302 | | CABLE ASSEMBLY: RF output; consists of: 7-1/2" RG-8/U, P310 and P309 (02572 Dwg No. A647-2301) | Connects T304 to FL301 Figure 5-10 |
| XDS301 | | LAMPHOLDER: White (72619 P/N 31914-117) | DS301 socket Figure 5-10 |
| XV301 | | Same as XV201 | V301 socket Figure 5-10 |
| XV302 | | Same as XV201 | V302 socket Figure 5-10 |
| XV303 | | SOCKET, ELECTRON TUBE: (Eimac SK-410) | V303 socket Figure 5-10 |
| XV304 | | Same as XV201 | V304 socket Figure 5-10 |
| XV305 | | Same as XV303 | V305 socket Figure 5-10 |
| XV306 thru XV310 | | Same as XV201 | V306 thru V310 sockets Figure 5-10 |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| B401 | | FAN, EXHAUST, ELECTRICAL: 6-1/2" dia, 115VAC motor, 3300 rpm; (82887 P/N 340ZS) | Cabinet exhaust Figure 5-12 |
| C401 | | CAPACITOR, FIXED, METALIZED PAPER DIELECTRIC: 2UF, 400VDCW; MIL type CH53B1ME205M | Blower motor shunt Figure 5-12 |
| F401 | | FUSE, CARTRIDGE: 15 ampere; (71400 P/N BAF-15) | Line fuse Figure 5-12 |
| F402 | | Same as F401 | Line fuse Figure 5-12 |
| F403 | | Same as F401 | Line fuse Figure 5-12 |
| FL401 | | FILTER, RADIO INTERFERENCE: Contains series coil consisting of 20 turns of no. 14 AWG wire on ferrite core and two shunt 1 UF, 400 volt capacitors; (02572 Dwg No. B647-1000) | Line filter Figure 5-12 |
| FL402 | | Same as FL401 | Line filter Figure 5-12 |
| FL403 | | Same as FL401 | Line filter Figure 5-12 |
| J401 | | CONNECTOR, RECEPTACLE, ELECTRICAL: UG-291/U | RF cable |
| MP401 | | AIR FILTER, MECHANICAL: 10" x 10" x 1"; (07643 type A-1) | |
| S401 | | SWITCH, INTERLOCK: MIL type MS16106-1 | Interlock Figure 5-12 |
| S402 | | Same as S401 | Interlock Figure 5-12 |
| S403 | | Same as S401 | Interlock Figure 5-12 |
| TB401 | | TERMINAL BOARD: (89020 type 25 #0213 section, 2 #61 clamp) | Interconnections Figure 5-12 |
| XF401 | | FUSEHOLDER: 3 pole for 13/32 dia x 1-1/2 fuse; (71400 P/N 4535) | F401, F402 and F403 holder Figure 5-12 |
| C501 | | CAPACITOR, FIXED, MICA, DIELECTRIC: 2200 UUF, ±10%, 500VDCW; CM30B222K | RF coupling capacitor Figure 5-14 |
| C502 | | CAPACITOR, FIXED, CERAMIC, DIELECTRIC: 0.01 UF, 500VDCW; (72982 P/N 811-.01) | Filter network capacitor Figure 5-14 |
| C503 | | Same as C502 | Filter network capacitor Figure 5-14 |
| CR501 | | SEMICONDUCTOR DEVICE, DIODE: Germanium, type 1N81 | Meter shunt |
| CR502 | | SEMICONDUCTOR DEVICE, DIODE: Silicone, type 650C | Meter protection shunt |
| CR503 | | Same as CR501 | Meter circuit rectifier |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| DS501 thru DS503 | | LAMP, INCANDESCENT: 125V, 6 watts; (24446 P/N 6S6) | Coupler lights Figure 5-13 |
| E501A | | ARRESTER, LIGHTNING: (02572 P/N B647-3411) | Arc suppression Figure 5-13 |
| E501B | | Same as E501A | Arc suppression Figure 5-13 |
| E502 | | INSULATOR, FEED-THRU: (75539 P/N 10300) | |
| J501 | | CONNECTOR, RECEPTACLE, ELECTRICAL: UG-22B/U | Part of W501 Figure 5-13 |
| J502 | | Same as J501 | Dummy load connector Figure 5-13 |
| J503 | | CONNECTOR, RECEPTACLE, ELECTRICAL: UG-58/U | P/O Z501 Figure 5-13 |
| J504 | | Same as J503 | P/O Z501 |
| J505 | | CONNECTOR, RECEPTACLE, ELECTRICAL: MS3108A22-19S | Input control Figure 5-13 |
| J506 | | CONNECTOR, RECEPTACLE, ELECTRICAL: (74545 P/N US12250) | 115VAC convenience outlet Figure 3-2 |
| J507 | | JACK, HEADPHONE: 2 circuits; (81812 P/N 91-25) | Headphone jack Figure 3-2 |
| J508 | | Same as J503 | S501 RF connector Figure 5-13 |
| L501 | | VARIOMETER, COMPLETE: (02572 Dwg No. E647-1414) | Impedance matching Figure 5-13 |
| L501A | | COIL, STATIONARY: R.F. tuning, 79 turns 7 x 59/36 Litz wire on 8" dia form with 15 taps; (02572 Dwg No. E647-1414) | Tapped main tuning coil Figure 5-13 |
| L501B | | COIL, MOVABLE: R.F. tuning, lower, 12 turns 7 x 59/36 Litz wire on 6" dia form; (02572 Dwg No. C647-1419) | Variable inductor vernier Figure 5-13 |
| L501C | | COIL, MOVABLE: R.F. tuning, upper, 12 turns 7 x 59/36 Litz wire on 6" dia form; (02572 Dwg No. C647-1418) | Variable inductor vernier Figure 5-13 |
| M501 | | METER, RF, THERMOCOUPLE: 0-15 amp, 3-1/2" dia; (02912 Model 308) | Antenna current meter Figure 3-2 |
| M502 | | AMMETER, DC: 50 microamp, 3-1/2" dia, special scale, 1175 ohm resistance (02572 Dwg No. B647-3515); (02912 Model 2531) | Standing wave ratio indicator Figure 3-2 |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| MP501 | | COUNTER DIAL: (74970 P/N 116-208-1) | Freq. A reactance tune |
| MP502 | | Same as MP501 | Freq. B reactance tune |
| MP503 thru MP506 | | COUPLING, NYLON: (99813 P/N AP15299) | |
| MP507 | | GEAR, WORM: Sterling gear WE-6 | |
| MP508 | | WORM: Sterling gear W7-2 | |
| MP509 | | Same as MP507 | |
| MP510 | | Same as MP508 | |
| MP511 | | KNOB, SPINNER: (74970 P/N 116-286) | Fine tune reactance |
| MP512 | | Same as MP511 | Fine tune reactance |
| MP513 | | Same as MP201 | Resistance tune |
| MP514 | | Same as MP201 | Resistance tune |
| MP515 | | KNOB, ROUND: (49956 P/N 90-2-2G) | SWR CAL & PANEL LIGHT |
| MP516 | | Same as MP515 | SWR CAL & PANEL LIGHT |
| MP517 | | KNOB, POINTER: (49956 P/N 70-5-2G) | SWR SELECTOR |
| MP518 | | KNOB: (72512 P/N 2710) | Push to read ant. current |
| MP519 | | KNOB: (02572 Dwg No. A647-3451) | Ant. disconnect |
| MP520 | | POINTER: (02572 Dwg No. A647-3450) | Ant. disconnect |
| MP521 | | KNOB: (02572 Dwg No. B647-1416) | Access door |
| MP522 thru MP527 | | KNOB: (02572 Dwg No. B647-1417) | Coupler door |
| P501 | | CONNECTOR, PLUG: UG-21B/U | RF connector |
| P502 | | Not used | |
| P503 | | Same as P501 | Part of W501 Figure 5-13 |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| P504 | | Same as P501 | Part of W502 Figure 5-13 |
| P505 | | CONNECTOR, PLUG, ELECTRICAL: MS3102A22-19P | Input control wiring connector |
| P506 | | Not used | |
| P507 | | Not used | |
| P508 | | Same as P501 | Part of W502 Figure 5-13 |
| R501 | | RESISTOR, VARIABLE, WIRE WOUND: 750 ohm, 25 watt; (44655 P/N RP102RD751KK) | Coupler light dimmer Figure 3-2 |
| R502 | | RESISTOR, VARIABLE, COMPOSITION: 10K, 2 watt; (44655 P/N RV4NATSD103A) | SWR Calibrate control Figure 3-2 |
| R503 | | RESISTOR, VARIABLE, COMPOSITION: 100 ohm, 2 watt; (44655 P/N RV4LATSA101A) | SWR BALANCE ADJ. Figure 5-13 |
| R504 | | RESISTOR, FIXED, COMPOSITION: 100 ohm, ±10%, 2 watt; MIL type RC42GF101K | SWR Divider circuit Figure 5-14 |
| R505 | | RESISTOR, FIXED, COMPOSITION: 150 ohm, ±10%, 2 watt; MIL type RC42GF151K | SWR Divider circuit Figure 5-14 |
| R506 | | Same as R505 | SWR Divider circuit Figure 5-14 |
| R507 | | RESISTOR, FIXED, COMPOSITION: 4.7K, ±10%, 1/2 watt; MIL type RC20GF472K | Filter network resistor Figure 5-14 |
| R508 | | Same as R507 | Filter network resistor Figure 5-14 |
| R509 thru R520 | | RESISTOR, FIXED, WIRE WOUND, NON-INDUCTIVE: 620 ohm, 91 watt; (44655 P/N 51063) | Dummy load Figure 5-13 |
| S501 | | RELAY, ARMATURE: RF, high voltage; (02572 Dwg No. D647-1401) | RF channel switch Figure 5-13 |
| S501A | | SOLENOID: 2 each, continuous duty; (73949 P/N 18) | |
| S501B | | CONTACT SET: Consists of:<br>4 (02572 No. A-647-3432),<br>1 (02572 No. B-647-3543),<br>1 (02572 No. A-647-3431),<br>5 (02572 No. A-647-3433),<br>2 (02572 No. A-647-3434),<br>2 (02572 No. A-647-3440) | |
| S501C | | Same as E501A | |
| S502 | | SWITCH, PUSH: DPST; (81073 P/N 35-1) | Coupler test key |

TABLE 7-2. MAINTENANCE PARTS LIST (CONT)

| REF. DESIG. | NOTES | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|
| S503 | | SWITCH, INTERLOCK: SPST; MIL type MS16106-1 | Door interlock Figure 5-13 |
| S504 | | SWITCH, LEVER: Antenna disconnect; (02572 Dwg No. D647-1402) | Antenna disconnect switch Figure 5-13 |
| S504A | | CONTACT SET: Consists of:<br>1 (02572 No. A-647-3447),<br>2 (02572 No. A-647-3448),<br>4 (02572 No. A-647-3542),<br>1 (02572 No. A-647-3530) | |
| S504B | | SWITCH DETENT: (71590 P/N P-273) | |
| S505 | | SWITCH, PUSH: Antenna current meter; (02572 Dwg No. D647-1408) | Antenna current meter shorting Figure 5-13 |
| S506 | | SWITCH, ROTARY: 1 pole, 12 position; (71590 P/N JV-9000 series) | Transformer tap switch Figure 3-2 |
| S507 | | Same as S506 | Transformer tap switch Figure 3-2 |
| S508 | | SWITCH, LEVER: High voltage tap; (02572 Dwg No. C647-1409) | Main inductor tap selector switch Figure 3-2 |
| S508A | | CONTACT SET: Consists of:<br>1 (02572 No. A-647-3536),<br>2 (02572 No. A-647-3539),<br>1 (02572 No. A-647-3540),<br>4 (71400 P/N 4594) | |
| S509 | | SWITCH, ROTARY: 2 pole, 3 position; (71590 P/N PA-2003) | SWR Indicator switch Figure 3-2 |
| T501 | | TRANSFORMER: RF, Impedance matching; (02572 Dwg No. D647-1415) | Impedance matching transformer Figure 5-13 |
| TB501 | | TERMINAL BOARD: (02572 Dwg No. B647-1406) contains the following components: C501, C502, C503, CR501, CR502, CR503, R504, R505, R506, R507, R508 | |
| TB502 | | TERMINAL STRIP: (75173 P/N 15-142) | Control wiring Figure 5-13 |
| W501 | | CABLE ASSEMBLY: R. F. consists of 15" RG-8/U, P503 and J501; (02572 Dwg No. B647-2408) | Connects RF input to Z501 or dummy load Figure 5-13 |
| W502 | | CABLE ASSEMBLY: R. F. consists of 14" RG-8/U, P504 and P508; (02572 Dwg No. B647-2409) | Connects Z501 to S501 Figure 5-13 |
| XDS501 thru XDS503 | | LAMPHOLDER: (72619 P/N 9S5038-L-1) | DS501 thru DS503 sockets Figure 5-13 |
| X501 | | NETWORK, IMPEDANCE MATCHING: Includes J503 and J504; (02572 Dwg No. C647-1403) | SWR Directional coupler Figure 5-13 |

TABLE 7-3. LIST OF MANUFACTURERS

| CODE | NAME AND ADDRESS |
|---|---|
| 00656 | Aerovox Corporation<br>New Bedford, Mass. |
| 01121 | Allen Bradley Co.<br>Milwaukee, Wis. |
| 02572 | Inland Electronics Corp.<br>Aurora, Ill. |
| 02660 | Amphenol-Borg Electronic Corp.<br>Chicago, Ill. |
| 02912 | Weston Instrument Division<br>Daystrom, Inc.<br>Chicago, Ill. |
| 04713 | Motorola, Inc.<br>Semiconductor Products Division<br>Phoenix, Ariz. |
| 07643 | Carey Electronic Engineering Co.<br>Metal Wool Division<br>Springfield, Ohio |
| 14655 | Cornell Dubilier Electric Corp.<br>South Plainfield, N. J. |
| 15605 | Cutler-Hammer Inc.<br>Milwaukee, Wis. |
| 24446 | General Electric Co.<br>Schenectady, N. Y. |
| 30703 | Industrial Timer Corp.<br>Newark, N. J. |
| 44655 | Ohmite Mfg. Co.<br>Skokie, Ill. |
| 49956 | Raytheon Mfg. Co.<br>Waltham, Mass. |
| 56289 | Sprague Electric Co.<br>North Adams, Mass. |
| 71400 | Bussmann Fuse Division<br>McGraw-Edison Co.<br>St. Louis, Mo. |
| 71482 | C. P. Clare and Co.<br>Chicago, Ill. |
| 71590 | Centralab Division of<br>Globe Union, Inc.<br>Milwaukee, Wis. |
| 72512 | Harry Davies Molding Co.<br>Chicago, Ill. |
| 72619 | Dialight Corp.<br>Brooklyn, N. Y. |
| 72982 | Erie Resistor Corp.<br>Erie, Pa. |
| 73690 | Elco Resistor Co.<br>New York, N. Y. |
| 74193 | Heinemann Electric Co.<br>Trenton, N. J. |
| 74545 | Harvey Hubbell, Inc.<br>Bridgeport, Conn. |
| 74970 | E. F. Johnson Co.<br>Waseca, Minn. |
| 75173 | Howard B. Jones Division<br>Cinch Mfg. Co.<br>Chicago, Ill. |
| 75539 | Lapp Insulator Co., Inc.<br>Leroy, N. Y. |
| 76493 | J. W. Miller Co.<br>Los Angeles, Calif. |
| 77342 | Potter and Brumfield, Inc.<br>Princeton, Ind. |
| 78277 | Sigma Instruments, Inc.<br>South Braintree, Mass. |
| 80294 | Bourns Laboratories, Inc.<br>Riverside, Calif. |
| 81073 | Grayhill Co.<br>La Grange, Ill. |
| 81812 | Trimm, Inc.<br>Libertyville, Ill. |
| 82376 | Astron Co.<br>East Newark, N. J. |
| 82877 | Rotron Mfg. Co.<br>Woodstock, N. Y. |
| 83330 | Herman H. Smith, Inc.<br>Brooklyn, N. Y. |
| 89020 | Buchanan Electric Products Co.<br>Newark, N. J. |
| 89665 | United Transformer Co.<br>Chicago, Ill. |
| 91637 | Dale Products Inc.<br>Columbus, Neb. |
| 94696 | Magnecraft Electric Co.<br>Chicago, Ill. |
| 96214 | Texas Instruments, Inc.<br>Dallas, Texas |
| 96401 | Guardian Electric Mfg. Co.<br>Chicago, Ill. |
| 99813 | Jan Hardware Mfg. Co.<br>Brooklyn, N. Y. |

# INDEX

SUBJECT

PARAGRAPH

E

Emergency Operation . . . . . 3-5
Other than Normal . . . . . 3-5a
Equipment Lists . . . . . 1-5
Electron Tube Complement . . . . . 1-5d
Equipment Required but Not Supplied . . . . . 1-5b
Equipment Supplied . . . . . 1-5a
Shipping Data . . . . . 1-5c

F

Failure Report . . . . . 6-1
Functional Description . . . . . 1-3
Amplifier-Oscillator . . . . . 4-1c
Antenna Coupler . . . . . 1-3b
General . . . . . 4-1a
Power Amplifier . . . . . 4-1d
Power Supply . . . . . 4-1b
Transmitter . . . . . 1-3a
Functional Operation . . . . . 3-1
Functional Sections of Antenna Coupler . . . . . 4-3
Coupler Network (Z1) . . . . . 4-3c
Dummy Load . . . . . 4-3b
General . . . . . 4-3a
Inductance (L501) . . . . . 4-3e
Meter (M501) . . . . . 4-3f
Transformer (T501) . . . . . 4-3d
Functional Sections of the Transmitter . . . . . 4-2
Amplifier-Oscillator Section . . . . . 4-2c
General . . . . . 4-2a
Power Amplifier Section . . . . . 4-2d
Power Supply . . . . . 4-2b

I

Inspection and Adjustments . . . . . 2-5
Antenna Coupler Adjustments When Antenna Impedance is Known . . . . . 2-5c
Antenna Coupler Adjustments When Antenna Impedance is Not Known . . . . . 2-5d
Inspection . . . . . 2-5a
Transmitter Adjustments . . . . . 2-5b
Installation Layout . . . . . 2-3
Installation Requirements . . . . . 2-4
Installation of Transmitter and Antenna Coupler . . . . . 2-4a
Interconnection Diagrams . . . . . 2-4c
Outline Drawings . . . . . 2-4b

SUBJECT PARAGRAPH

O


Operating Procedures . . . . . 3-3
Adjustments . . . . . 3-3e
Antenna Coupler Controls . . . . . 3-3b
Meter Readings . . . . . 3-3d
Precautions . . . . . 3-3g
RF Output . . . . . 3-3f
Sequence of Operation . . . . . 3-3c
Transmitter Controls . . . . . 3-3a
Operator's Maintenance . . . . . 3-6
Emergency Maintenance . . . . . 3-6c
Operator's Checks and Adjustments . . . . . 3-6a
Parts Replacement . . . . . 3-6d
Routine Check Charts . . . . . 3-6b
Overall Schematic Diagrams . . . . . 6-6


P


Parts List . . . . . 7-1
Introduction . . . . . 7-1
List of Manufacturers . . . . . 7-4
Maintenance Parts List . . . . . 7-2
Stock Number Identification . . . . . 7-3
Performance Standards . . . . . 6-3
Power Requirements and Distribution . . . . . 2-2
Power Requirements . . . . . 2-2a
Preparation for Reshipment . . . . . 2-6
Preparation for Use . . . . . 3-2
Preventive Maintenance . . . . . 6-2
Purpose of Equipment . . . . . 1-2


Q


Quick Reference Data . . . . . 1-4
Antenna Coupler . . . . . 1-4c
Communication Transmitter . . . . . 1-4b
Transmitting Set, Radio AN/URT-20 . . . . . 1-4a


R


Removal, Repair and Replacement . . . . . 6-5
Chassis Removal . . . . . 6-5b
General . . . . . 6-5a


S


Scope . . . . . 1-1
Summary of Operating Procedures . . . . . 3-4

SUBJECT PARAGRAPH

T

Trouble Shooting . . . . . 5-1
General . . . . . 5-1
Location of Parts . . . . . 5-5
Overall Trouble Shooting . . . . . 5-3
Control Settings . . . . . 5-3a
Trouble Shooting . . . . . 5-3c
Visual Inspection . . . . . 5-3b
Voltage and Resistance Diagrams . . . . . 5-3d
Test Equipment . . . . . 5-2
Typical Troubles . . . . . 5-4
Tuning and Adjustments . . . . . 6-4
General . . . . . 6-4a
Oscillator Gain Control . . . . . 6-4c
Power Amplifier Grid Bias . . . . . 6-4b

U

Unpacking and Handling . . . . . 2-1